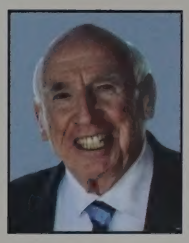
THE POLAR TIMES

JOHN SPLETTSTOESSER — 1933–2016

July 2016



President's Message

Dear Fellow American Polar Society Members:

I hope this finds all of you well, enjoying a beautiful and not too warm summer wherever you might be.

I am still your President, to my surprise, and it appears will remain so until the Board of Governors of the American Polar Society organizes and initiates an election for a new president.

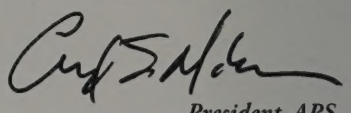
In the meantime, if you have not already heard, it is my duty to inform you that a very sad event occurred in late January with the unexpected and sudden loss of APS Board of Governors Chairman and former President John Splettstoesser. This issue of *The Polar Times* is dedicated to John, a steadfast and tireless advocate for APS over many decades.

Those of you who have had the privilege of knowing him would, I have no doubt, agree that he was one of God's true gentlemen. John was a close personal friend, whom I knew for more than 20 years and whose strong support of my initiatives as APS president ensured that we not only remained financially solvent but that our two recent seminars — at Woods Hole in 2013 and Scripps Institution of Oceanography this past November 2015 — were in all respects great successes.

Although much more will be said of John in this issue, I do want to state that John was an unusually knowledgeable, kind, and thoughtful man of great character. He successfully raised and nurtured a loving family, yet always found time to teach and mentor many, many others throughout his all-too-short life. He was also the best teammate one could have, whether it be on cruise, in the field, or relaxing over a drink together.

John, you are, and will always be, sorely missed.

Alfred Scott McLaren
Captain, USN (Ret.), PhD



President, APS

Membership Letter

Hello from Maine!

It is late spring, early summer here in New England, the water is calling me for scuba diving, and the trees have their leaves back.

Another year for the American Polar Society Membership Center is under way, although we at the APS are saddened by the loss of one of our stalwart members, John Splettstoesser, who passed away earlier this year. John introduced me to the APS as well as to many folks in the polar world and somehow wrangled me, some years ago, into this position of APS membership chair. He then kept me interested, energized, and involved with all things polar through his wonderful anecdotes, emails, book review,s and connections. We were usually in daily contact with each other. He was my mentor and a good friend, and he will be greatly missed.

A big thank-you to all you members who renew when you're supposed to or — even better — those of you who do it early. Another thank-you to those of you who keep us updated with changes in your email or regular mail contact information, as well as you who bring in new members, which is always greatly appreciated.

Please contact us at aps@bluestreakme.com if you have any questions.

Charles Lagerbom

APS Membership Chair

Send membership requests/
and contributions to:
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About Our Covers and Centerfold

- ***Front cover:*** Art rendering of John Splettstoesser at an Antarctic crossroads.
- ***Back cover:*** The upper portions of stony coral colonies were exposed to air and intense rainfall events during low tides over about one week, on the Heron Island reef flat (Great Barrier Reef) in March of 2011. The bleached white portions of these colonies are still alive but have lost their symbiotic dinoflagellate algae, which normally give these colonies a yellow brown appearance. If bleached coral branches do not recover their dinoflagellate algae communities within four to six weeks, they will die and their surfaces will be covered by macroalgal competitors (dark brown exposed coral branches). **Photo by Adrienne M.S. Correa**
- ***Centerfold:*** USCGC HEALY transits through ice above the Arctic Circle. The scientific name for this "Arctic rainbow" is "parhelion," but it is sometimes referred to as either a "sun dog" or a "22-degree halo." It forms over the horizon due to the reflection of the sun off of ice crystals. **Photo by PA2 Cory Mendenhall, USCG (8/23/2015)**

American Polar Society

The American Polar Society was founded Nov. 29, 1934, to band together all persons interested in polar exploration. Regular membership dues are $25 a year and entitle members to receive *The Polar Times* twice a year. The American Polar Society is classified as a tax exempt organization under Sec 501(C)3 of the IRS Code. For more information about the American Polar Society, contact Charles Lagerbom, APS Membership Chair, at aps@bluestreakme.com

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The Polar Times

July 2016, Vol. 3, No. 29

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Editor's Privilege

John Splettstoesser

John Splettstoesser died 25 January 2016, a devastating loss to family, friends, colleagues and the American Polar Society.

I visited him in Waconia, Minnesota, last November enroute home from our symposium in La Jolla, California.

We spent perhaps 12 to 14 hours together. He gave me the grand tour of Waconia and told me the story of his life growing up there.

We did a drive-by of his boyhood home, and he pointed out the window to his bedroom. It was only four to six feet above ground level, which led me to believe that he may have used it for unauthorized access/egress in his teen years.

For years, John and I exchanged emails on a daily basis. Mostly about *The Polar Times* or the tribulations of the American Polar Society. Even so, we were quick to pass each other jokes, cartoons, and the occasional serious commentary we might find on the Internet.

The following — an excerpt from an article by Mr. Fay Vincent — is something I would have passed to John in a Minnesota minute.

Life as the Ninth Inning Nears

One of the many problems with advancing age—not old age, please—is there is too much to read about the end of life.

Books and articles about dying are in vogue, but I could not finish Dr. Atul Gawande's best-selling "Being Mortal." I do not want to know how much my brain is shrinking and why my teeth will fall out. Spare me.

I am comforted by the realization that everyone is getting older and so we are all in the same boat. My contemporaries share my experiences, and they have the same fears and many of the same limitations as I do.

I am still excited by good books, and I try to persuade others to read what has thrilled me. But many of us do not want to be pushed. We prefer to discover good books on our own.

My interest in sports—baseball, of course—remains strong, though it is narrower than it used to be. I no longer watch hockey or boxing. But I never miss the World Series, or the Masters, in part because of the captivating natural beauty of the Augusta golf course. Despite a football lineage—my dad was an NFL official—I rarely watch the second half of the Super Bowl. The games are too long, and half-time shows are a bizarre reminder of music I do not understand. Why is there so much jumping up and down?

I spend most of my time in the company of my cherished wife. I think there is truth in the old line that older marrieds tend to resemble each other as time goes by. I enjoy visits with friends as well, but I have a rule: None of us can speak more than three sentences about medical news. I am certain my problems have limited interest, and so, I fib a lot when I am asked how I am doing.

To me, old age seems to be the art of keeping going. Speed and direction are not important. Movement is. I swim but slowly. I barely walk. I write, but with acute knowledge that my values and opinions are outdated. I still think duty, honor and country should be the national mantra. I know better.

The very best thing about growing older is that I no longer try to change anyone's mind. I can easily accept disagreement from friends and even critics. I also have long since surrendered any hope of impressing others, or of being impressed by them. In these final innings I want to stay at bat, even if I know I cannot expect to get a hit.

I am not selling anything nor am I buying. I want only to be at peace and in normal discomfort. Age makes life simple until it does not.

Yes, the rear view mirror is where I get the most pleasure. There I can run and jump and shag high fly balls in the many sunny baseball fields of my youth. There are still those joyful memories of good times and old pals and long dead family and friends. That is what is left now, and that has to be fine with me. ¶

I found the above article in the *Wall Street Journal* on 25 February 2016, a month to the day after John passed. For those who do not recognize the author's name, Mr. Vincent was formerly CEO of Columbia Pictures, an executive of Coca-Cola, and commissioner of Major League Baseball, 1989-1992.

When I read this article the hair stood up on the back of my neck. It was as if Mr. Vincent had been with us on the Waconia visit. John and I, too, talked of old age, the aches and pains, the declining number of topics that commanded our attention — sports, music, and ... what's with all this jumping up and down and screaming at Super Bowl halftime?

We know John read prodigiously and that he wrote for everyone of inquiring intellect. We know John enjoyed sharing his experiences and his writings and photographs, so much of it now encased in *The Polar Times*. And we know that his work, wit, and generous spirit will sparkle in our rear view mirror whenever matters polar come to mind.

Thank you, Mr. Vincent.

Thank you, John. — ***Cliff Bekkedahl, Managing Editor*** ¶

'Spletts Rocked!'

by Denise Landau

If anyone could have made Gondwana reunite, it would have been John Splettstoesser. With John's recent passing, the world is left with subduction zones of great magnitude. John was the glue that held more polar information together than most anyone around the world.

If you look up Geographic Place Names in Antarctica, you'll find **Splettstoesser Glacier** at 79°12'S and 84°09'W. It is a 35-mile-long glacier flowing ENE through the Heritage Range to the South of Founders Peaks and Anderson Massif, named for John in 1961-62 for the Ellsworth Mountain Party participation. Twenty years later, **Splettstoesser Pass** was named for John at 71°39'S and 167°15'E, named for his field coordinator role for the US-ARP during the Northern International Victoria Project in 1981-82. John had a long work career as a geologist for the Minnesota Geological Survey, taught university geology in Maine, and was a committed polar scientist for many years before he became involved in tourism.

He began working in the 1980s on board the early tourist vessels to Antarctica, lecturing on geology and glaciology and anything else that was needed. I met John on my first voyage to Antarctica in 1991. His explanations on how Antarctica was formed and how ice shaped the Antarctic landscape helped launch my love for high-latitude regions. His endless patience and descriptions of the topography of Antarctica had me hooked.

I started working closely with John in early 1992, a few months after IAATO was created. I was on the executive committee of IAATO for seven years before taking over as executive secretary, then director (1999). From 1999 to 2008, I worked closely with John as an advisor to IAATO. He attended Antarctic Treaty meetings and other meetings as needed. We wrote numerous

> *He was absolutely the best! I know he touched all our lives in important and meaningful ways. I have known him since 1998. Very key, if not essential, to the success of our last two symposiums and for APS, in general. A completely wonderful, loyal friend and the perfect teammate on any project. Much more than my "right hand man" during my presidency! John was always positive, never negative, and really gave everything worth doing his all. A very courageous man, as well, who never talked about his deteriorating physical condition. One of God's great gentlemen and a wonderful role model for us all.* — **Fred McLaren, APS President**

John and penguins at Half-Moon Island.

policy papers on minimizing environmental impacts in Antarctica, which were presented at many global meetings and formed the basis for tourism guidelines in remote regions around the world. He truly believed that well-managed tourism could be successful.

His endless enthusiasm to provide students and others who inquired about tourism and any other fact imaginable was effortless for John. He stored facts, figures, and stories like no one else I ever met and was always willing to share. Countless times, I emailed him from far-flung places, asking geology and rock questions. He always had the answer.

I worked with John for many years on ships as expedition staff, lecturer, and expedition leader, with IAATO, and for the last six years with the American Polar Society (APS). He joined the Society back in 1963 and was dedicated towards making the organizational successful. He served as president, chairman, conference organizer, editor, and anything else the APS needed and was our superglue in keeping the APS intact.

John was a prolific writer of five books, 145 published papers, and more. He was one of the very best proofreaders I've ever met. He had an encyclopedic brain for stories and landforms.

Recently he worked really hard in making sure the APS' 80th Anniversary Symposium on Polar Oceans was a success. It was! His articles and editorials in and perspectives on *The Polar Times* were a driving force for the magazine production.

Mostly, John was good friend. He was always inspiring to talk with, cared deeply for polar regions, and interjected humor wherever he could. We always laughed about something whenever we spoke. I had the great privilege of travelling with him on the first-ever passenger circumnavigation of Antarctica; spending 66 days with him was an enriching time for me and for all others who were there. Despite a helicopter crash on a deck of a ship, during which he was slightly injured, or when he was asked to dress in drag — including fish net stockings — for the amusement of the passengers, he did it with humor and grace. He cared deeply for his daughters, worried about them endlessly. His voice was always melodic, as if he cherished every conversation.

We will truly miss our good friend and colleague, both for his hugely resourceful mind and for his endless optimism and humor.

The Polar Regions have always attracted larger-than-life characters, and John certainly holds his place amongst the best. His work in both the Arctic and Antarctic, with IAATO, with the U.S. Antarctic Program, Geological Survey, universities, the American Polar Society, and the Antarctican Society for over 55 years truly grants him a place in the Holocene. ¶

John (above left) in an equator-crossing production of "Swan Lake." Below, another equator crossing in the company of King Neptune.

My condolences go out to John's family on the loss of this very fine gentleman. I had not seen him in years, but many phone conversations with him last year – in the course of drafting an article for The Polar Times *– rekindled a friendship. Among members of the polar community – as with everyone who knew him, I'm sure – he'll be deeply missed. Blessings to you all.* — **Bob Dodson**

John Splettstoesser was my predecessor as assistant director of the Ohio State Institute of Polar Studies when I took over in 1974. He was a great person and an expert geologist as well. His organizational skills were excellent. He also introduced me to the Antarctic Tour guide possibilities, and my second visit to Antarctica was the direct result of his intercession. John was a fine friend, even though he was distant, geographically. Best wishes. — **Pete Anderson**

Memories of Father

by Brenda Splettstoesser Malarchik

My sister Edith and I had extraordinary lives being the daughters of a polar scientist. Since our father, John F. Splettstoesser, was a geological engineer, we spent many occasions rock- and fossil-hunting and going to museums.

I was the first daughter, born in Shakopee, Minnesota. Dad was attending the University of Minnesota at the time. Dad, mom and I lived in student housing on Como Avenue in St. Paul. Occasionally on a weekend, Dad would take me to Pillsbury Hall (the Department of Geology and Geophysics) at the University of Minnesota. He would give me some of the leftover rocks and fossils from class, which I still have and which mean so much to me.

During school break, Dad took mom and me canoeing and camping in Canada, where we went to rock exhibits and gem shows. After Dad graduated from the University of Minnesota, we moved to Silver Spring, Maryland, where he took a position at the Library of Congress in Washington, D.C.

After seven years of being an only child, my dear sister Edith was born in Bethesda, Maryland. Now dad had two daughters to take rock- and fossil-hunting, to museums, etc...!

From Washington, D.C., Dad's career took us to Ohio, Nebraska, and eventually back to Minnesota. As we grew up, we shared social gatherings with other polar scientists, their wives, and their children. We, the offspring of these brilliant and brave fathers, knew that they would be gone from time to time, from fall to late winter, doing their research in Antarctica. At other times of the year, they would be gone to meetings, symposiums, etc. For us children, this was normal, and we never gave it thought. It wasn't until Dad's funeral, where I got to see one of my dear childhood friends — another "polar kid" — that some of those great childhood memories I hadn't thought of for years, mainly of our father's travels to Antarctica, started coming back to me. We, the "polar kids," really were privileged to have fathers in this unique science.

Edith and I have so many wonderful memories of our father. He was quiet, gentle, and had a sense of humor none could forget. When we were growing up, Dad enjoyed playing basketball, football, Frisbee, croquet, and badminton with us after dinner. Edith and I helped him with outdoor chores like mowing the lawn, raking fall leaves, and shoveling snow. Dad put up a tire swing in one of the tall elm trees in the front yard of our house in Ohio and would push us in the swing. He was never too busy to spend time with us. When I was six years of age, I had the red measles. He stayed up all night with me as my fever broke. As he read by my bed side, I can still hear the soft sound of the newsprint as he turned each page of *The New York Times*.

Edith went on two Antarctic cruise tours with dad. She and her husband, Brad, visited him often at his apartment in Waconia, Minnesota, where he retired. My husband, John, and I live in Arizona. Living far away makes it difficult to see our families. But Dad always emailed with us, and we talked on the phone frequently, especially in the morning. He was always ready to give support and advice when things weren't going well with health or when one of the many problems of life happened.

I once asked Dad if he had wanted sons instead of daughters. He said absolutely not. He was so happy to have Edith and I. Grandmother Frieda, Dad's mother, called us "John's girls." My sister is 52 years of age, and I'm 59. To this day, we are still referred to as "John's girls" by our aunt Mary, Dad's oldest sister. No wonder she's our favorite aunt!

Dad was a dear, loving father and friend. He was a very good father-in-law to John and Brad. He had many friends. Simple words for a man who did so much in his

Opening Christmas gifts in Antarctica

*I woke up the other morning with the image in mind of a snow petrel (*Pagodroma nivea*) winging its way over the fast ice of Antarctica. Then I heard of the passing of John Splettstoesser, former president, chairman, conference organizer, and editor at the American Polar Society. A likable legend, John – better known as "Spletts" – was admired and loved for his knowledge, humanity, generosity, kindness, and great sense of humor. He mentored so many who had (and still have) the privilege to work and play in the Arctic and Antarctic. Antarctic ornithologist Richard White once told me that to get a good photo of a snow petrel would be like having an angel land on your shoulder. You'd need a lot of inspiration. Spletts was exactly that.* — **Kim Heacox**

I am stunned. There is a hole in my heart and tears in my eyes. — **Merlyn Paine**

I am devastated. He was our anchor.
— **Sheldon Bart**

life, was loved by so many, and was never boastful.

One more memory of dad from the late 1970s in Minnesota. We were all ready to go in the Ford station wagon to Grandfather and Grandmother Splettstoesser's house for Thanksgiving dinner. One of our cats, Tilly, got outside the house and climbed up a tree on a downhill slope. We debated whether to leave her to get down by herself or to try to get her down before we drove off. We decided Dad should get Tilly down and put her in the house before we left. Dad walked into the brush down the hill until he was out of sight. Not long after that, Tilly came out of the brush — but where was Dad? He eventually came out of the brush, got back to the car, and climbed in. He was disheveled, with leaves and twigs in his hair and on his overcoat. He was NOT happy. I could have sworn I saw smoke coming out of his ears. Not a word was said and off we went to the grandparents' house in total silence. What ever happened on that slope, dad never said, and we knew to never ask about it either! ¶

I am sorry I didn't have the chance to know your friend and colleague, John. From everything I'm learning about him now, I've missed a great man. Condolences to you and the rest of this group who have lost a dear friend. — **Patty Elkus**

Like all of you, I am extremely saddened by this news. I first met John in Antarctica in 1960 at Byrd Station and have worked on and off with him since that time. We published papers on Antarctic Mineral and Petroleum in an AGU volume which he edited with another former APS president, Gisela Dreshoff. John and I also participated in a number of Antarctic Treaty Consultative Meetings as part of the US delegation. He persuaded me to stand for election as president of the APS.— **John Behrendt**

John and I became close friends during our years working together, and I've missed his funny and informative emails every day since he left. But now, in the midst of assembling this July 2016 issue of the magazine, his loss is felt all over again. We won't have a "Due South" column in this issue. We'll have fewer book reviews and none of John's informative articles. And we may have a lot more typos, because he was a primo proofreader. In his absence, it may become necessary for the editorial staff of The Polar Times *to somewhat reinvent our wheel. But it will never roll again quite like it rolled before.* — **Charlotte Sinclaire**

Back when the world was young ...

Rising Concerns...

Dr. Jim Hansen—currently, Director, Climate Science, Awareness and Solutions program at Columbia University Earth Institute and a good friend of APS—has kindly allowed us to draw upon the following text from an advance notification video produced for a paper that he and 18 colleagues have prepared for publication this summer, entitled "Ice Melt, Sea Level Rise, and Superstorms."

Even as this introduction is being written (late April 2016), this paper is causing a stir in the popular press and could become a benchmark document for public understanding of the real and looming consequences of climate change.

Words mean something, especially in the scientific world, and most scientists are extremely careful in their use. Those who dabble in hyperbole to create or sustain a reputation eventually come a cropper. I offer this reminder because the literature of global warming and climate change has begun to feature words and tphrases with meanings clear and beyond misinterpretation: "irreparable harm," "unstoppable." Read "Ice Melt," and you'll find more.

In the instant situation, the words are strong and unequivocal—the Greenland ice sheet is melting and sending fresh water into the nearby Atlantic in volumes unimaginable a few decades ago. Down south, the West Antarctic ice sheet(s) is on the move, with glacier tongues lifted and lubricated with sea bottom water just slightly warmer than surface water.

Here is where the word "unstoppable" comes into play. These two phenomenon, alone, portend a sea level rise of 6 to 18 feet in the Western hemisphere by the end of this century. And with this rise in sea level will come the "irreparable harm." Read on. ¶

EDITOR'S ALERT

Scattered within these pages, as you read, you will find gray boxes containing snippets of distressing information concerning life style and economic and social conditions imperiling indigenous populations all along the northern reaches of Alaska and Canada. Please refer to articles on pages 26 and 27 for more information. ¶

What You Need to Know About the Irreparable Harm of Climate Change

Excerpt from Dr. Jim Hansen video at www.huffingtonpost.com—We have uncovered information and a partial understanding of feedbacks in the climate system, specifically interactions between the ocean and the ice sheets. These feedbacks raise questions about how soon we will pass points of no return, in which we lock in consequences that cannot be reversed on any time scale that people care about.

Consequences include sea level rise of several meters, which we estimate would occur this century or at latest next century, if fossil fuel emissions continue at a high level. That would mean loss of all coastal cities, most of the world's large cities and all their history.

A more immediate threat is the likelihood of shutting down the oceans overturning circulations in the North Atlantic and Southern oceans. That's where superstorms come in. Let me explain.

All hell would break loose in the North Atlantic and neighboring lands.

We use global climate modeling, paleoclimate data — that's Earth's ancient climate history — and modern observations of the ocean and ice sheets to study effects of ice melt on Greenland and the Antarctic ice shelves (tongues of ice extending from Antarctica into the Southern Ocean).

Greenland and Antarctica are beginning to melt because of global warming. So far it is just a tiny, tiny fraction of the ice sheets that has melted. However, this fresh meltwater spilling out onto the North Atlantic and into the Southern Ocean already is having important effects.

We conclude that light freshwater added to upper layers of the ocean is already beginning to shut down North Atlantic Deep Water formation and Antarctic Bottom Water formation. This will have enormous consequences in future decades, if full shutdown is allowed to occur.

United Nations IPCC, Intergovernmental Panel on Climate Change, does not report these effects, for two reasons. First, most models used by IPCC simply exclude ice melt. Second, we conclude that most models, ours included, are less sensitive than the real world to added freshwater, because most models have excessive small scale ocean mixing, which reduces the effect.

The surface manifestation of slowdown of the deep circulations is cooling in the North Atlantic southeast of Greenland and in the Southern Ocean. These coolings are prominent in our model by the middle of the 21st century. However, on multiple grounds, we conclude that the real world responds faster to freshwater than the models do.

First, let's note that North Atlantic cooling, if the overturning circulation shuts down entirely, will have large effects. The tropics continue to warm as CO2 increases. If Greenland freshwater shuts down deepwater formation and cools the North Atlantic several degrees, the increased horizontal temperature gradient will drive superstorms stronger than any in modern times. All hell would break loose in the North Atlantic and neighboring lands.

Such a situation occurred in the last interglacial period, 118 thousand years ago. The tropics were about 1°C warmer than today because Earth's spin axis was tilted less than today. Ocean core data show that deepwater formation shut down, the North Atlantic cooled, and there is evidence of powerful superstorms at about that time, powerful enough for giant waves to toss 1000 ton megaboulders [6] onto the shore in the Bahamas. Some scientists think these boulders may have been tossed by a tsunami, but we present multiple lines of evidence that the boulders and other geologic features are best explained as the result of superstorms.

An important point is that if we let ice melt from Greenland become large enough to fully shut down the AMOC, the Atlantic overturning circulation, it will be per-

(Continued at Right)

manent as far as the public is concerned. It takes several centuries for AMOC () to get moving again.

However, superstorms will not be the most important consequence of global warming, if it continues to grow. The most important effect will be sea level rise. Here too, the most complete analysis must account for paleoclimate data, which shows that ice sheets, when they disintegrate, can go quickly, non-linearly, yielding multi-meter sea level rise in a century, even when the climate forcing is weaker than the human-made climate forcing.

[7] We show from paleoclimate data that most ice sheet models are more lethargic than the real world, in which sea level is known to have risen rapidly many times. So instead of using an ice sheet model, we simply assume that when warming occurs driven by a growing climate forcing the rate of ice melt will grow nonlinearly. We test several alternative growth rates.

What we find are amplifying feedbacks, just what is needed to feed nonlinear ice melt growth. Greenland meltwater reduces the density of surface water, thus reduces sinking of water to the deep ocean. As meltwater grows it shuts down the ocean conveyor, as Wally Broecker calls it.

More important, for sea level, is what is happening around Antarctica. Sinking of heavy, salty cold water near the Antarctic coast normally forms Antarctic Bottom Water, thus also bringing relatively warm water to the surface, where it releases heat to the atmosphere and space.

Now, as fresh meltwater from Antarctic ice shelves increases, it tends to put a cold low density lid on the Southern Ocean. This reduces exchange with the surface, so the heat stays in the ocean, raising the temperature of ocean water at the depth of ice shelves, an amplifying feedback.

In a global perspective, cold freshwater lenses around Antarctica increase the planet's energy imbalance. The added energy goes into the ocean where it is available to melt ice shelves.

These feedbacks support our conclusion that melt in response to strong forcing will be nonlinear. These feedbacks, with meltwater driving subsurface warming, also help us understand and gain a consistent picture of rapid nonlinear climate oscillations in the paleoclimate record.

[8] Paleoclimate data makes clear that when ice sheets melt, they can go fast. However, we do not know the characteristic time for the nonlinear ice sheet response to growing climate forcing. Eventually ice sheet models may give us an answer, but for now our best guide is observations.

Unfortunately records of growing annual mass loss by the ice sheets are short. The Greenland data can be fit as well by 10-year or 20-year doubling times, but already Greenland is losing several hundred cubic kilometers of ice per year. Feedbacks for Greenland, with its surface melt, are different than for Antarctica, but there are several amplifying feedbacks. Greenland response to global warming will be nonlinear, but likely with a different characteristic doubling time.

Antarctic mass loss is smaller. Most melting so far is ice shelves, which does not show up in gravity satellite measurements of mass change. However, as ice shelves disappear, the discharge of non-floating ice will accelerate.

If ice sheet mass loss has a 10-year doubling time, meter-scale sea level rise would be reached in about 50 years, and multi-meter sea level rise a decade later. 20-year doubling time would require about 100 years.

The data records are too short. But if we wait until the real world reveals itself clearly, it may be too late to avoid sea level rise of several meters and loss of all coastal cities. I doubt that we have passed a point of no return, but frankly we are not certain of that.

There's an analogous, but I believe more imminent, situation with shutdown of overturning ocean circulations. The cold regions southeast of Greenland and around Antarctica are signs of the beginning of shutdowns of the AMOC, in the North Atlantic, and the southern Ocean SMOC.

(Continued on page 10)

Photo by Bethany Legg

(Continued from page 9)

We note that effects of meltwater seem to be occurring 1 or 2 decades earlier in the real world than in our model. Why would models be less sensitive to today's moderate meltwater amounts? We present evidence for excessive small scale ocean mixing in many models, including ours.

One key diagnostic is the climate response time. In 100 years our model achieves only 60% of its equilibrium response. I have checked three other major climate models, two American and one British, finding similar slow response. However, we have shown that Earth's measured energy imbalance requires the 100-year climate response to be about 75% if equilibrium climate sensitivity is about 3°C, as paleoclimate data show to be the case.

The explanation for why the surface response is so slow in the model is that the model ocean mixes heat too rapidly into the deeper ocean. This same excessive mixing causes the models to be less sensitive to the freshwater lens on the ocean surface, which also tends to mix too fast.

There is other data, besides Earth's energy imbalance, supporting this interpretation, including the sensitivity of paleoclimate to freshwater forcing. However, there is one recent paper that is especially important, by Winton et al. (2014), who show that a model with 0.1° resolution, fine enough to resolve small scale ocean motions and avoid parameterized mixing, yields a surface temperature response about a quarter larger after 50-100 years, consistent with our interpretation.

It would be valuable if all models would report their surface climate response function as well as their equilibrium climate sensitivity, and examine the model sensitivity to a standard rapidly increasing rate of meltwater injection.

The relevance is that I believe we are already witnessing the beginning of this cooling southeast of Greenland and cooling around Antarctica in response to freshwater from ice melt.

This is a tragic situation — because it is unnecessary.

In that case observed cooling southeast of Greenland and the extra warming along the United States East Coast are not natural fluctuations — when AMOC slows down it causes both of those. This interpretation implies that Greenland meltwater is already having significant effects. The warm water along the East Coast is the reason that "Sandy" retained hurricane force winds all the way up to the New York City area — the nearby Atlantic was about 3°C warmer than normal. This unusually warm ocean water has also been able to provide the moisture for record snowstorms in recent years.

These are small effects compared to what happens if AMOC shuts down entirely.

So the question arises again: have we passed a point of no return, is ice melt sure to increase so that AMOC shutdown is a foregone conclusion? I doubt it, but it's conceivable, depending on how fast we slow down human-made climate forcing.

I think the conclusion is clear. We are in a position of potentially causing irreparable harm to our children, grandchildren and future generations.

This is a tragic situation — because it is unnecessary. We could already be phasing out fossil fuel emissions if only we stopped allowing the fossil fuel industry to use the atmosphere as a free dumping ground for their waste.If we collected a gradually rising fee from fossil fuel companies, we could phase over to clean energies — if done right it would spur the economy and create jobs.

But that's a story for another day.

One final point. This is a complex story, but one with important practical implications. I find that the public sometimes misinterprets our science discussions, how research is done. Skepticism is the lifeblood of science. You can be sure that many scientists, indeed most scientists, will find some aspects in our long paper that they would interpret differently. That's entirely normal. It takes time for conclusions to be agreed upon and details sorted out.

So after you have talked to a scientist about this topic, ask him or her a final question. Do you agree that we have reached a dangerous situation? Do you think we may be approaching a point of no return, a situation in which our children inherit a climate system undergoing changes that are out of their control, changes that will cause them irreparable harm? That's the bottom line. ¶

Beaufort Sea Polar Bears Are Spending More Time Ashore

And It May Be A Wise Move

***Alaska Dispatch News*, 2 July 2016, ANCHORAGE, by Yereth Rosen**— As Arctic sea ice dwindles, polar bears are spending more time on land. Now a long-term study tracks the dramatic change in behavior over the recent warming in the Beaufort Sea off northern Alaska and northwestern Canada.

Polar bears in the beleaguered southern Beaufort Sea population are now three times as likely to come ashore in summer and fall as they were in the mid-1980s, according to the study, by scientists from the U.S. Geological Survey, the U.S. Fish and Wildlife Service and two universities. The bears that come ashore are also staying there much longer than bears did in the past, according to the study. ¶

Photo courtesy Alaska Dispatch News

A polar bear walks along the beach in Kaktovik, Alaska, at sunset on Sept. 7, 2012.

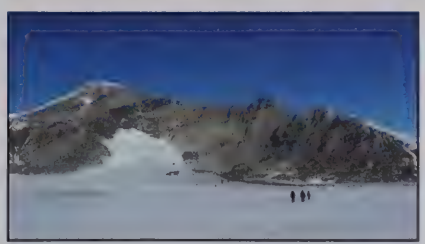
Asgard Range with Catspaw Glacier, Victoria Land, Antarctica

Nitrous oxide (N2O) is an important greenhouse gas that doesn't receive as much notoriety as carbon dioxide or methane. Now, a new study confirms that atmospheric levels of N2O rose significantly as the Earth came out of the last ice age and addresses the cause. Oregon State University (OSU) research on Taylor Glacier in the Dry Valleys, Antarctica, measured increases in atmospheric N2O concentrations about 16,000 to 10,000 years ago. Ice from the end of the last glacial period is outcropping at Taylor Glacier, providing easy access to large ice samples. The air bubbles enclosed in the ice allow for the reconstuction of the past atmospheric composition. "The end of the last ice age represents a partial analog to modern warming and allows us to study the response of natural nitrous oxide emissions to changing environmental conditions," said Adrian Schilt, who did much of the work as a postdoctoral researcher at OSU. "This will allow us to better understand what might happen in the future." The research was funded in part by the National Science Foundation. (Image date: November 2011). Photo courtesy of Adrian Schilt and Edward Brook, Oregon State University.

Antarctic Mountain Named for UCSB Professor, APS Member Bruce Luyendyk

***Santa Barbara Independent*, 23 April 2016, by Staff**—"You go to Hawaii and turn left," said Bruce Luyendyk. "Then at the bottom of the world, you're there." What he's describing is Mount Luyendyk, a peak in Antarctica's Fosdick Range that's has been newly named in his honor. A couple of the UCSB professor emeritus of marine geophysics' former students recommended it be named after him for his "research contributions to West Antarctica and science advocacy over 25 years," and the U.S. Board on Geographic Names agreed formally on January 19, reported UCSB's The Current.

In 1989, Luyendyk was camped out there with a team that included Christine Siddoway, now teaching at Colorado College and one of the students who nominated him; the other supporter was UCSB's Chris Sorlien, a member of the school's Earth Research Institute. They were 800 miles from McMurdo Station living in 8'x8' tents, through stunningly clear weather and a "horrendous blizzard" alike. They knew that New Zealand had ripped from the Antarctic continent and partly submerged, while the Fosdick Range rose, but why? Their field research eventually revealed "that there was an unusual amount of heat in the mantle that centralized over the Antarctic side," said Luyendyk. "That basically started the engine that created the asymmetry between these mountains and the New Zealand side."



Mt. Luyendyk in Antarctica's Fosdick Range has been named for UCSB professor emeritus Bruce Luyendyk. (Courtesy photo)

He returned on an expedition in 1990, but now, he said, "I'd love to go back, but that's for young people." ¶

Editor's Note

Below is an extract of an article published in the U.S. Naval Institute Proceedings in December 2015, authored by Captain Lawson Brigham USCG (Ret.), APS Board of Governors and frequent contributor to *The Polar Times*.

Both Captain Brigham and the Naval Institute have graciously extended permission to reprint this timely call to action.

Perspective: Readers are urge to bear in mind as they read this article that the United States of America has two (2) ice breaking-capable ships in their inventory while Russia has close to forty (40), with a wide range of capabilities, including nuclear-powered breakers in service and in the building ways, and one launched a little over a month ago.

If you can wrap your arms around this disparity, then I urge that you ask yourself, which of these nations is serious about their involvement in Arctic and Antarctic waters?

More Assets for the Arctic

By Captain Lawson Brigham, U.S. Coast Guard (Retired)

The nation's limited icebreaking capacity is finally attracting the attention it has richly deserved for so long.

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By any measure 2015 was a challenging and highly successful year for U.S. Coast Guard polar operations and the nation's two polar icebreakers, the USCGC *Polar Star* (WAGB-l0) and *Healy* (WAGB-20). Dialogue is continuing on how to rebuild the nation's polar icebreaker fleet, with President Barack Obama weighing in on the issue in September during his visit to Alaska and in a White House Fact Sheet announcing new federal Arctic investments, including icebreakers) Likely not since the time of President Franklin D. Roosevelt's request during World War II for a U.S. icebreaker fleet has a U.S. President been personally and directly involved in such issues.'

Deployments to the polar ends of the world showcase today's global maritime reach of the United States provided by Coast Guard polar icebreakers. Recapping the operational year, the *Polar Star* and *Healy* supported multiple U.S. agencies in their polar work and a major international ocean-research program. A notable search-and-rescue operation was executed in a remote region with difficult Antarctic sea ice conditions. The *Healy* completed the first U.S. unaccompanied icebreaker transit to the North Pole as well as the cutter's third visit there, but the first since 2005. These highly successful operations in Antarctic waters and across the central Arctic Ocean basin visibly demonstrate how an effective icebreaker capacity can provide reliable and unambiguous U.S. polar maritime presence.

Unique National Maritime Assets

Coast Guard polar icebreakers are instruments of national policy and the visible, sovereign presence of the United States in Arctic and Antarctic waters. They are foremost capital maritime and naval assets of the U.S. government that historically have supported a host of federal agencies. Operating independently in the polar regions where the United States has broad national interests, these specialized naval vessels can provide the commander-in-chief and the unified combatant commanders—the Northern and Pacific Commands would be the obvious potential Department of Defense users—a unique polar capability that is undeniably an integral component of American naval and maritime power. No other surface ships in the U.S. National Fleet (a joint U.S. Navy and Coast Guard concept and effort to address commonality and interoperability) can operate safely and effectively anywhere on the global oceans *and* along the relatively uncharted coastal waters of the Arctic and Antarctic. Surface and subsurface combatants rarely operate in these high-risk and shallow coastal waters, making a Coast Guard icebreaker the sole U.S. maritime and naval presence in those areas.

A U.S. polar icebreaker must also be viewed as a Coast Guard cutter with an inherent design that allows effective operation in all types of sea ice along with sustained on-scene presence and assured polar marine access. Cutters such as the *Polar Star* and *Healy* are essentially mobile Coast Guard multi-mission bases or platforms with long-range endurance in all polar marine regions. Ship-based mobility and the agility and flexibility to respond in the face of rapidly changing sea ice and other polar environmental conditions are an icebreaker's greatest assets.

A commanding officer of these ships holds a wide range of legal authorities and responsibilities identical to all Coast Guard cutter commanders. That same captain also leads an independent marine operation with all its logistical challenges to the far reaches of the planet, providing the United States with a key global maritime capability. Every officer who has served on board one of these cutters understands the singular importance of this strategic requirement. A review of the types of missions with which a captain might be tasked on a polar deployment is instructive. Several examples illustrate a complex suite of plausible missions:

- Conducting Coast Guard statutory missions (such as law enforcement; search

A view of the ice at night from the Aloft Conning Station onboard USCGC HEALY (21 Sept 2015 by PA2 Cory Mendenhall, USCG)

and rescue; marine safety; marine environmental protection; aids to navigation; defense readiness; ports, waterways and coastal security; and more) in U.S. and international waters. Of importance, all cutters are the primary U.S. maritime law-enforcement presence at sea.

- Enforcing U.S. law and sovereign rights in the U.S. territorial sea, contiguous zone, and exclusive economic zone. Operations could include enforcing U.S. law on American vessels and citizens who might be operating in Antarctic waters for research, contract work, or adventure tourism.
- Responding to high-latitude incidents, emergencies, and potential maritime disasters from ships or marine operations associated with offshore development such as exploratory drilling. In such circumstances an icebreaker acts as the U.S. government's on-scene presence for command and control and can provide icebreaking in support of unlocking frozen harbors and waterways to facilitate commercial supply access.
- Conducting science and research in the national interest in the most demanding and remote regions at both ends of the world. Expeditions could include polar marine-transportation research and development in support of future systems for the U.S. maritime Arctic.
- Conducting bathymetric and scientific surveys north of Alaska to support a future U.S. extended continental shelf claim under the provisions of Article 76 of the United Nations Convention on the Law of the Sea and more traditional bathymetric surveying along select routes within the U.S. maritime Arctic.
- Working in concert with U.S. and foreign polar research vessels and assuring access to remote survey locations that only a few of the world's icebreakers can reach.
- Serving as an integral element of a support and search-and-rescue network for U.S. naval operations *and* DOD research in the Arctic Ocean. Support to the DOD can include icebreaking operations along the western coast of Greenland to the U.S. northernmost defense facilities at Thule Air Base.
- Acting as a mobile observation platform in all polar marine environments and during long transits of the global ocean and providing ocean and atmospheric data to ground truth satellite and aerial observations. Support to such agencies as NOAA, the National Science Foundation (NSF), the National Air and Space Administration, and the DOD for polar environmental observation has been long-standing.
- Conducting icebreaking operations in support of the U.S. Antarctic Program, led by the NSF, such as the seasonal breakout of the McMurdo base for resupply-ship access and conducting Antarctic Treaty inspections around the continent led by the Department of State.

Notably, all of these missions have been conducted by Coast Guard polar icebreakers in recent decades during an era of fewer ships and an aging fleet. The current imperative to replace these capital assets is what the President addressed during his visit to Alaska. Announced were his plans to accel-

erate acquisition of additional icebreakers, with mention of a key caveat for multiple ships that can operate year-round in the Arctic Ocean.' This is a significant high-end operational requirement that suggests new icebreakers would be among the largest and most powerful afloat. Viewed from strategic and global perspectives, such ships could also conduct all current and future U.S. icebreaking requirements in the Antarctic.

Links to Arctic Marine Transportation

There is considerable misunderstanding about the future use of the Arctic Ocean for marine transportation and the potential role of icebreakers as facilitators of marine traffic. Using a scenarios or futures effort, the Arctic Council's Arctic Marine Shipping Assessment (AMSA) released in 2009 found that the primary driver for Arctic navigation is the development of onshore and offshore natural resources and many links to global commodities markets (and prices)! Another finding was that the profound Arctic sea ice retreat being observed in all seasons is important to navigation in that it provides greater marine access and potentially longer seasons of navigation.

However, also key is that the Arctic Ocean remains fully or partially ice-covered for nearly eight to nine months each year. It is not an ice-free ocean, and one plausible navigation season will likely be three to four months in summer along the entire length of the Northern Sea Route (NSR) from Kara Gate to the Bering Strait; year-round navigation has been maintained for more than three decades in the western areas of the Russian Arctic.'

In an effort to build a reliable and safe national Arctic waterway, Russia employs a fleet of large nuclear- and diesel-powered icebreakers for use in convoying and ice escort of commercial ships that are primarily carrying natural resources out of the Russian Arctic to global markets. However, even Russian maritime experts state that the NSR is a seasonal complement to a route using the Suez Canal around Eurasia.[6] Few believe the NSR will become a trans-Arctic container-shipping route, primarily limited by its seasonality of access and overall environmental challenges that have an impact on reliability.'

Two highly relevant issues are influencing the possible operation of government-owned icebreakers for potential ice convoy in the Arctic marine areas of the United States and Canada. One issue is technical: the emergence of highly capable icebreaking commercial carriers that operate independently without the need for icebreaker escort. This is the likely future operational mode that is economically viable for commercial ships throughout the Arctic Ocean. These advanced icebreaking cargo ships have successfully sailed in the Russian maritime Arctic, including the NSR, and within the Canadian Arctic and through the Northwest Passage. The second issue relates to national policy and the future establishment of U.S. and Canadian Arctic marine transportation systems that could require escort or convoy icebreakers to extend the ice-navigation season beyond summer.

Would the two governments provide Coast Guard icebreakers for routine escort duties if many of the ships being supported do not trade in U.S. and Canadian ports? Such a scenario would seem problematic, and a viable alternative would be to have privately owned icebreakers chartered to support commercial shippers where and when required. While the justification of new U.S. Coast Guard icebreakers is clearly not based on convoying commercial ships in open Arctic seas, these ships would be available for response operations and potentially for the breakout of ports and coastal waterways (such as is conducted on the Great Lakes and in the U.S. northeast).

Past Polar Icebreaker Studies

In July1984 the Coast Guard released a major interagency assessment, the *United States Polar Icebreaker Requirements Study (PIRS),* which had been mandated by the Office of Management and Budget.' This key analysis has remained a framework document on U.S. polar icebreaker issues for three decades. It provided the historical context for U.S. polar ships that have operated in Alaska since its purchase from Russia in 1867, in war-time theaters such as Greenland during World War II, and in the Antarctic since the early 20th century. The report affirmed the need to replace aging *Wind-class* icebreakers with new polar icebreakers operated by the Coast Guard.

A fleet of four icebreakers was recommended to meet a broad range of strategic and bipolar national interests. *PIRS* was updated in 1990 by a Presidential Report to Congress, which concluded that a fleet of the two *Polar*-class ships and an NSF polar research vessel should be joined by a new polar icebreaker with enhanced research capabilities. This report was the impetus for Congress to fund construction of the *Healy,* which was commissioned in 2000.

A high-level committee of the National Research Council released an authoritative and comprehensive study of future U.S. polar icebreaker needs in 2007.[9] It contains strong recommendations that the United States must continue an active and influential presence in the Arctic and Antarctic and maintain a fleet of Coast Guard polar icebreakers. Again, this study called for the renewal of the nation's polar icebreaker fleet.

In 2010 a report prepared for the Coast Guard by outside consultants—the *United States Coast Guard High Latitude Region Mission Analysis,* using operations-research modeling—concluded that to meet its statutory polar missions the service would require three heavy and three medium icebreakers. More ships would be needed (a mix of six heavy and four medium icebreakers) if a requirement for continuous polar presence was maintained consistent with a joint Naval Operations Concept developed that year. The bottom line for all of these studies is the need for the U.S. government to operate a fleet of Coast Guard polar icebreakers to meet our broad national interests in the emerging Arctic and Antarctic. All of these studies are consistent in recommending three or more highly capable Coast Guard polar icebreakers for global operations.

Federal Budget Challenges

In an era of multiple congressional budget constraints, the funding for even a single new polar icebreaker (at $800-900 million) is complex. It has been very difficult for the administration and Congress to identify a viable and fundable long-term strategy for icebreaker procurement. A significant challenge the Coast Guard has confronted for decades, even when under the Department of Transportation, has been the size of its acquisition, construction, and improvements account. That cannot easily accommodate partial funding identified for a polar icebreaker, given the range of cutter, aircraft, and shoreside assets that require renewal and replacement.

The Coast Guard, with a strongly held view that a polar icebreaker is a national asset with multiple agency users, seeks to have significant funding contributions from other agencies. This could only

come about by those agencies' deferral or cancellation of a host of future acquisitions such as aircraft, ships, weapons, satellites, research equipment, and more. It is important to remember that procurement of the *Healy* was accomplished with non—Coast Guard funding solely from the Navy's shipbuilding account. A more equitable strategy must be found. Others are pursuing alternative strategies to somehow reduce or defer funding for polar icebreakers:

- Funding the reactivation of the USCGC *Polar Sea* (WAGB-11) as a stopgap measure while new ships are under construction.
- Investigating strategies to build an icebreaker in a foreign shipyard (today likely illegal without Presidential intervention, and doubtless politically unacceptable).
- Pursuit of leasing arrangements of polar icebreakers with the private sector (notably the entire cost of a long-term federal lease must be identified up front; such leases are likely more expensive to the federal government and the taxpayer).

One plausible future strategy may be *incremental* increases in the Homeland Security/Coast Guard budget for icebreaker acquisition with costs spread over a broad suite of stakeholder agencies. This would surely require a directive from President Obama or his successor. Action even today would create a several-year gap in the operation of the nation's most capable icebreaker while awaiting the commissioning of a new ship.

Looking Forward

Multiple interagency, independent, and Coast Guard assess-ments—and more than three decades of debate—have highlighted the strategic needs for U.S. government-owned polar icebreakers best operated by the Coast Guard. With a rapidly changing Arctic and rising marine use in the region, these requirements have increased, providing greater strategic clarity on this issue. The U.S. Arctic policy statement in 2009 and a *National Strategy for the Arctic Region* issued in 2013 have reinforced our national interests in the area. Most would agree that our national polar (maritime) interests are not well served by outsourcing them to foreign governments. Nor are these same strategic needs met by potentially available (but less capable) domestic or foreign-flag commercial icebreaking ships that lack the robust, multi-mission capacity of Coast Guard icebreakers.

The time for further study and continued debate about U.S. polar icebreakers is over, as surmised by President Obama and his Executive Office team, with action taken as far back as a Fiscal Year 2013 budget submission to initiate an icebreaker-procurement process. A "whole of government" approach responding to this deficit and funding these national assets is still required to harness interagency and congressional support and limit parochial interests and budgetary rivalry. A recent clarion call in Washington and the current U.S. chairmanship of the Arctic Council reminds Americans that we are an Arctic nation.

A strong signal is also needed to remind all of us that America, as a leading and influential polar nation, continues to have critical strategic interests and key investment needs in both polar regions throughout the 21st century. Few requirements are more important than modern Coast Guard icebreakers that maintain our *global* maritime capability, assure polar marine access, and provide visible, effective U.S. maritime presence. ¶

A view of HEALY's aft working deck and aft A-frame in thick ice above the Arctic Circle. (2 Sept 2015 by PA2 Cory Mendenhall, USCG)

Juneau Man Captures Story of Icebreaker 'Storis' in Labor-of-Love Documentary

In 1957, the Storis (stern number W38) became the first U.S. ship to transit the Northwest Passage. (Photo Courtesy of US Coast Guard)

***Alaska Public Media*, 30 May 2016, by Liz Ruskin**—Congress is considering funding a new icebreaker to serve in the Arctic. It would be a heavy, polar-class Coast Guard cutter, to get through thick ice. But size isn't everything when it comes to Coast Guard ships. A Juneau man has made a film about the Storis, a dainty icebreaker by polar standards, that rescued mariners and enforced the law along Alaska's coast for almost 60 years.

It took Damon Steubner eight years to make this documentary. He and his wife, Rebecca Smith, worked on it in between their state jobs, as their time and money allowed. Now, they recoup a tiny bit with the sale of $20-DVDs, one at a time.

"It was a labor of love," Steubner said.

Sometimes, love shows up when you least expect it. This one came on a snowy night in Juneau, when Steubner and Smith were in the throes of moving.

"We were moving into a house and someone walked by and said they were working with a group to save this old military ship from a scrapyard and thought I'd be a good person to work on it," he said. "And my reaction at the time was 'sorry, I'm moving into a house. I don't have the time.' But he kept insisting and finally I relented."

Stuebner is a former TV news videographer who now works for the state division that includes archives. He and Smith traveled to the National Archives and elsewhere in the Lower 48 to find records, videos and photographs, and to conduct interviews. The result is a 1 hour and 40 minute documentary, "Storis: The Galloping Ghost of the Alaskan Coast." It traces Storis's journey, from its work in World War II, to its long history in Alaska, dating to 1948, when it came to Juneau. Stuebner said the story of the ship tells Alaska's story.

"Storis was there for the Exxon Valdez oil spill. It was there for the trans-Alaska pipeline construction. It was there, for the 1964 Earthquake … It was the very first ship to have law enforcement seizures in the Bering Sea."

Storis was the first or the last or the oldest in a lot of categories. It was the first American ship, for instance, to travel the Northwest passage, from the Bering Sea through the Arctic to the Eastern Seaboard. It's a gripping part of the movie, as Storis and its two companion ships battled thickening ice.

"We were just stuck and lifted up by the ice, and wherever the ice floe went, we went."

"Tuesday 30th July 1957. Tire fenders were rigged out. And we waited. Engines were to no avail. Ice blocked screws and rudders and the relentless elements just took over control. Listing was extreme. Spar heeled to nearly 20 degrees."

As the Stuebner's film tells it, the Storis wasn't so much stuck in ice as getting pushed out of it, as the sea froze under the hull. The film includes footage of crewmembers walking on the jumbled ice, trying everything, even dynamite, to release the cutters.

Perhaps most suspenseful is the story of Storis's attempt to rescue the *fishermen of the* Alaskan Monarch in the Bering Sea in 1990. It's a saga told with interviews and video from multiple cameras that were on scene.

"They had to use the basket as kind of a dredge to get the basket down into the ice and get those people out of the ice and up into the helicopter."

In 1991, Storis became the oldest Coast Guard ship, the so-called queen of the fleet. She held the crown for 16 years. The documentary shows her decommissioning and her exile, stripped of all ornament and instrument, anchored in purgatory in a California bay.

When Stuebner began his film, a group was working to save the Storis as a museum. Juneau attorney Joe Geldhof was part of the museum group.

"The Storis was a vessel worth preserving. It just didn't happen."

In 2013, the U.S. Government sold Storis for $70,000 and she was taken away for scrap. The Alaska congressional delegation tried to pass a bill to spare her for a museum. Geldhof says it's not that anyone really opposed the idea. But, he says, Storis was lost in the congressional scuffle.

"Do I feel bad that we didn't save the ship? Sure, but I'm really pleased to see we brought together a lot of people and we're commemorating the people who sailed the ship."

The documentary, Geldhof says, now serves as the ship's memorial. It's called "Storis, the Galloping Ghost of the Alaskan Coast."

As for Stuebner, he's already working on his next Coast Guard documentary. ¶

Alaska Faces a Clear Budget Deficit Without an Evident Solution

***The New York Times*, 9 April 2016, by The Associated Press, JUNEAU, Alaska**—The collapse in oil prices has left oil-reliant Alaska with a multibillion-dollar budget deficit and few palatable options for digging its way out.

With just days left in the legislative session, state political leaders are struggling to get on the same page, with legislators split on options like taxes, the depth of budget cuts and tinkering with the annual dividend most Alaskans receive for living here. Gov. Bill Walker sees a mix of all three as necessary.

Gunnar Knapp, an economics professor, has told lawmakers that Alaska is probably facing a recession and that the economy will take a hit no matter what they do. He has urged significant steps toward reducing the deficit this year.

The state has been using savings stashed away when oil prices were high to help cover costs. But without a plan, and barring a dramatic rebound in oil prices, Mr. Walker says major reserve accounts and the decades-old dividend program could be gone within a matter of years.

Alaska also could see further hits to its credit rating, which has already been downgraded. The governor has warned that legislators could face a special session if they do not come up with a fiscal plan before the regular session ends on April 17.

The Senate president, Kevin Meyer, a Republican, said he believes legislators have the right attitude — "that we need to do something and we need to do something major." What that ends up being remains unclear.

Among the big pieces in play: Bills that would allow for structured annual draws from the earnings of the Alaska Permanent Fund to help pay for state government. Changes to the Medicaid and oil and gas tax credit programs, which have become major budget items. Bills to reinstitute a personal state income tax for the first time since 1980 and proposals from Mr. Walker to raise taxes on motor fuels and on various industries, including oil, fishing and mining. State spending plans also need to be completed.

Some legislators still see room to cut the budget ... Others say everything needs to be discussed,

The major debate at this point appears to be around using earnings from the Alaska Permanent Fund, what tax bills to pass, if any, and how far to push changes to oil taxes and credits. There is debate, too, over how much needs to be done this year.

Some legislators still see room to cut the budget and do not want to create or raise taxes at this point. Others say everything needs to be discussed, even adding triggers to tax bills that would revoke any increases if oil prices hit a certain level.

That approach has been taken with legislative rewrites of the proposed increase in the motor fuels tax, which would go away if North Slope oil during the previous calendar year averaged more than $85 a barrel. Prices recently have hovered at or below $40 a barrel.

Some want broad changes to oil and gas tax credits, seeing the system as unsustainable. The state estimates that during the coming fiscal year it will owe $775 million in credits to companies with no tax liability, typically smaller companies developing and exploring on the North Slope and Cook Inlet. That includes newly earned credits and those beyond a cap imposed by Mr. Walker for the current year. Others worry about the impact that big changes or a tax increase will have on an industry also reeling from low prices.

The permanent fund issue is significant. The fund is a nest egg of sorts born of oil wealth and grown through investments, and the earnings reserve is the pot of money from which the annual dividends are derived. While legislators have long been able to take money from the fund's earnings, they have been loath to do so for fear of being accused of raiding it. The fund's principal is constitutionally protected.

In previous years, voting to touch the permanent fund dividend almost certainly would have been political suicide and it is still a sensitive topic. For lower-income Alaskans and those living in high-cost rural areas, the dividend can be an important source of income. The House minority leader, Chris Tuck, a Democrat, says the earnings fund should not be the first or only option.

House Speaker Mike Chenault said trying to get agreement on a plan even within his own Republican caucus is tough. "The only thing that they've all agreed to is, they want to get out of here on time," he said. ¶

Russia Weighs Cuts to Icebreaker Funding

***The Independent Barents Observer*, 17 March 2016, by Atle Staalesen**—The strained Russian economy does not allow for major investments in new icebreakers.

The icebreaker program is on the cut-list along with 41 other federal investment projects, newspaper Vedomosti reports. The list was discussed in a meeting between President Vladimir Putin and key government ministers last Thursday, the newspaper writes.

The 42 projects include investment amounting to 347.3 billion rubles, of which credits were to account for 235.5 billion.

The meeting revealed major differences in the position of the country's Central Bank and the Ministry of Economic Development. While the former proposes to boost federal project financing in a bid to vitalize the economy, the latter wants to proceed with the cut-plan.

As previously reported, Russia is in the process of *unfolding a major icebreaker program*, which includes both nuclear-powered and conventional diesel-engine vessels. The jewel in the program is the LK-60 (project 22220) icebreaker, which will be able to ship through three meter thick ice. At least two LK-60 vessels are planned built, the first one of them, the Arktika, is to be ready for service in 2019.

Russia is also building the world's biggest diesel-engine icebreakers, the LK-25 (project 22600). The first vessel of the kind, named "Viktor Chernomyrdin," is built for the Russian state company Rosmorport and is significantly behind schedule. ¶

Oil Companies Abandoning Arctic as Temps Rise on the Drilling Debate

***The Washington Post*, 11 May 2016, by Juliet Eilperin**—The decision by major oil companies to relinquish roughly $3.2 billion in oil and gas leases this week has sparked the once-settled debate on drilling in the rapidly warming Arctic.

Major oil and gas firms confirmed they have abandoned most of their leases in the Arctic in a move that comes as the debate over how best to protect the Arctic from rapid warming has roared back to life.

Oil giants Royal Dutch Shell, ConocoPhillips and others have relinquished roughly $3.2 billion worth of oil and gas leases spanning 900,000 hectares of the Arctic Ocean, company officials confirmed Tuesday.

That news comes just as U.S. President Barack Obama and others are facing new pressure to address never-before-seen change in the region.

In March, the maximum winter sea ice extent in the Arctic hit a record low. That same month, parts of the Arctic were more than 4°C higher than the historic average.

"Today we are an important step closer to a sustainable future for the Arctic Ocean," said Michael Levine, Pacific senior counsel for the advocacy group Oceana. "Hopefully, today marks the end of the ecologically and economically risky push to drill in the Arctic Ocean."

Increasing numbers of U.S. lawmakers are speaking out in favor of protecting the Arctic. Last week, a group of 66 congressional Democrats signed a letter calling for the Obama administration to ban Arctic drilling altogether in the next round of leasing.

"As this administration laid out in the U.S.-Canada Joint Agreement, our nation should be focusing on achieving strong conservation goals for the Arctic and making decisions to develop oil and gas resources only when the highest safety and environmental standards are met, including national and global climate and environmental goals," they wrote. "To meet these goals, the Arctic Ocean should be permanently protected from oil drilling, not used to drill for more fossil fuels that we will not need — and must not burn — if we are serious about powering our future with clean energy."

The U.S. Arctic is estimated to hold 27 billion barrels of oil and 3.7 million cubic meters of natural gas, but oil prices have crashed since 2014 and energy companies have struggled to tap the resources buried below the Arctic's icy waters.

All told, the companies have relinquished nearly 80 per cent of the leases they bought from the U.S. government in a 2008 auction.

Cindy Shogan, executive director of the Alaska Wilderness League, said Tuesday that there was no longer a way to reconcile oil and gas extraction in the Arctic with Obama's climate goals. "The president has made a commitment to address climate change and protecting the Arctic must be part of that equation," she said.

The new push comes as Obama is set to discuss Arctic warming with leaders of Denmark, Finland, Iceland, Sweden and Norway at the White House Friday.

Rafe Pomerance, who heads a coalition of non-governmental organizations researching Arctic climate science and policy known as Arctic 21, said that when it comes to the summit, "the real elephant in the room is climate change."

In addition to recent record temperatures, April marked the lowest Northern Hemisphere snow cover on record.

"The Arctic is losing its brightness," Pomerance said, adding that trend of less reflective snow will in turn accelerate sea ice loss in an area that warms two to three times as fast as lower parts of the globe.

Walt Meier, a research scientist at the NASA Goddard Space Flight Center's Cryospheric Sciences Laboratory, said that "weather conditions in a given year, and even in a given location" help determine the maximum extent of the winter ice each year. But the fact that the maximum winter ice cover is now 7 per cent below the average for the past three decades, he added, is significant.

> *"A 1- or 1.5-degree temperature rise in a place like Washington is something you may not notice that much, but up in the Arctic it can be the difference between skating on the ice, and swimming,"* — **Walt Meier, Research Scientist**

"A 1- or 1.5-degree temperature rise in a place like Washington is something you may not notice that much, but up in the Arctic it can be the difference between skating on the ice, and swimming," Meier said.

In an interview Monday, Sweden's ambassador to the United States, Bjorn Lyrvall, said that the energy and climate components of this week's agreement "will be substantial," but the world's nations must focus on implementing the global climate accord reached in December in Paris before committing to more ambitious climate targets.

"We're obviously concerned about the science and the recent developments being reported," he said. "First of all, we have to make sure what has been agreed will be implemented."

Norway's ambassador to the United States, Kare Aas, said in an interview that his nation was keenly aware of climate impacts, which is why it had pledged to spend $470 million a year for the next decade to preserve forests in poorer countries.

"As an Arctic country, we are really witnessing the climate change as we are living. We are happy to see more countries are interested in paying a visit to the Arctic to see what's happening there for themselves," he said. "What Norway is doing on forests, including deforestation in developing countries, is part of our global agenda in fighting climate change." ¶

At the core of many problems in the Alaska Native community are unhealed psychological and spiritual wounds and unresolved grief bought on by a century-long history of deaths by epidemics and cultural and political deprivation at others' hands; some of the more tragic consequences include the erosion of Native languages, in which are couched the full cultural understanding, and the erosion of cultural values.

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In one of every eight villages, unemployment among Native men is in excess of 50 percent; in one-third of all Native villages, male unemployment—at 32 percent—is nearly quadruple the statewide average unemployment rate.

Unmanned Drones Sail the Bering Sea

Researchers in Bering Sea use autonomous sailing vessels to collect ocean data

***News Deeply (Arctic Deeply),* 14 June 2016, by Hannah Hoag**—At the end of May, two 6m (20ft)-tall orange autonomous sailing vessels, each with a vertical carbon-fiber wing, were set loose in the Bering Sea from a dock in Dutch Harbor, Alaska. Each of the vehicles had been programmed with a single instruction: to sail hundreds of kilometers into the southeastern Bering Sea to a bright yellow, donut-shaped buoy named "Peggy."

By June 3, 11 days into the trip, the pair of Saildrones, as they're called, had traveled more than 200 nautical miles through cold and choppy seas. En route, Saildrone 128 snapped pictures, including one of its companion Saildrone 126 floating on the dark blue water, one of a purple sky and one of a crooked sunset. They also collected hundreds of thousands of data points, sampling water and the air, and listening for sea life.

The solar- and wind-powered vehicles, built by a California company, are part of an ocean research program that aims to expand researchers' understanding of the physics, chemistry and biology of the Bering Sea, and how it is changing. "They can provide a new platform that scientists can use to remotely study the oceans in ways that were not possible before," said Chris Sabine, director of the National Oceanic and Atmospheric Administration's Pacific Marine Environmental Lab (PMEL), at a press conference.

The Bering Sea is a wide wedge of ocean, sandwiched between Alaska and Russia, and bounded to the south by the sweeping arc of the Aleutian Islands. It holds some of the world's most biologically productive waters, abundant in food for the ribbon seals, gray whales and tufted puffins that feast there in the spring. It also produces almost half of the fish and shellfish caught in the U.S. Salmon, king crab and the biggest catch of all, Alaska pollock, pull in more than $1 billion a year.

But the Bering Sea is showing strong signs of climate change. The sea ice doesn't reach as far south as it once did and the seasonal melt is starting earlier in the spring. The sea is also becoming more acidic. Cold water is especially good at absorbing carbon dioxide from the atmosphere, nudged along by glacier melt and river runoff.

"The Bering Sea is very sensitive to climate change, and how its ecosystem responds to the reduction of sea ice is an important question that we are investigating," said Phyllis Stabeno, a physical oceanographer at PMEL in Seattle, Washington.

Each Saildrone carries a payload of sensors that measure wind speed, air temperature and humidity, ocean surface temperature, water temperature, salinity, dissolved oxygen and fluorescence (an estimate of how much phytoplankton is in the water). They also hold acoustic fish finders to look for pollock and passive acoustic monitors that listen for the distinctive shotgun pop and up-call vocalizations of the endangered North Pacific right whale. Each vessel records up to 86,400 measurements a day – almost one every second. Some are transmitted through a satellite link to researchers, others are archived to an onboard hard drive for later retrieval.

The Saildrones appeal to researchers because they can cover large areas and collect near real-time oceanographic data in a more cost-effective way. The alternative – the way most research on the area has been done up until now – is to spend days at a time on a ship, such as the 63m (208ft)-long Oscar Dyson, a research vessel operated by NOAA.

But ship time is costly. Research onboard the Dyson runs at $20,000–25,000 per day, compared to the $1,000–2,000 per day it costs to operate a Saildrone. "These aren't going to replace ships, but they're going to supplement and be a strong partner in the program," said Doug DeMaster, science director of the Alaska Fisheries Science Center.

Studying the North Pacific whale is a good example of how the drones can complement ship-based research, said DeMaster. Although they once numbered in the tens of thousands, the whales were nearly hunted to extinction.

They were knocked down to less than 100 animals in the eastern North Pacific, and there are probably now fewer than 50," said DeMaster. Trying to find them in the eastern half of the sea – an area larger than the state of California – from a cruising ship is "very inefficient," he said. "At this point we don't even know what neighborhood they're in." If a Saildrone hears one, it will give researchers some clues about where these elusive whales might be found on the next research cruise.

The passive acoustic monitors on board the Saildrones will record marine mammal sounds throughout the mission, said Jessica Crance, a marine mammal biologist with the Alaska Fisheries Science Center. "By integrating the Saildrone into our research, we can cover a large area that we have not been able to cover in over a decade," she said.

As the air and water sensors collect environmental data, the Saildrone will also use an active acoustic pinger – a fish finder – to gather information about pollock. In addition to being important to commercial fishermen, pollock are the primary food for northern fur seals, a species whose 30-year decline is poorly understood.

The Saildrones will steer back to Dutch Harbor and be picked up in September, after logging thousands of kilometers through the Bering Sea. Despite the harsh weather conditions – 80-knot winds, 12m (40ft) seas and near-freezing temperatures – they're expected to do well. Last year, the same Saildrone pair spent three months touring the Bering Sea. "It's a pretty brutal environment," said DeMaster. "But so far, the technology has kept up." ¶

The lack of adequate sanitation and water facilities in the villages has been cited as the primary cause of many health problems and the rampant amount of disease found in the villages; the villages in southwestern Alaska have the highest incidences of hepatitis B and other communicable diseases.

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In 1950, heart disease was the cause of death for only one of every 20 Alaska Natives. Today, every sixth Alaska Native dies from this cause.

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Murder rate among Alaska Natives is four times the national average.

Climate-Related Death of Coral Around World Alarms Scientists

***The New York Times*, 10 April 2016, by Michelle Innis, SYDNEY, Australia —** Kim Cobb, a marine scientist at the Georgia Institute of Technology, expected the coral to be damaged when she plunged into the deep blue waters off Kiritimati Island, a remote atoll near the center of the Pacific Ocean. Still, she was stunned by what she saw as she descended some 30 feet to the rim of a coral outcropping.

"The entire reef is covered with a red-brown fuzz," Dr. Cobb said when she returned to the surface after her recent dive. "It is otherworldly. It is algae that has grown over dead coral. It was devastating."

> *"This is a huge, looming planetary crisis, and we are sticking our heads in the sand about it."* — **Justin Marshall, Director, CoralWatch**

The damage off Kiritimati is part of a mass bleaching of coral reefs around the world, only the third on record and possibly the worst ever. Scientists believe that heat stress from multiple weather events including the latest, severe El Niño, compounded by climate change, has threatened more than a third of Earth's coral reefs. Many may not recover.

Coral reefs are the crucial incubators of the ocean's ecosystem, providing food and shelter to a quarter of all marine species, and they support fish stocks that feed more than one billion people. They are made up of millions of tiny animals, called polyps, that form symbiotic relationships with algae, which in turn capture sunlight and carbon dioxide to make sugars that feed the polyps.

An estimated 30 million small-scale fishermen and women depend on reefs for their livelihoods, more than one million in the Philippines alone. In Indonesia, fish supported by the reefs provide the primary source of protein.

"This is a huge, looming planetary crisis, and we are sticking our heads in the sand about it," said Justin Marshall, the director of CoralWatch at Australia's University of Queensland.

Bleaching occurs when high heat and bright sunshine cause the metabolism of the algae — which give coral reefs their brilliant colors and energy — to speed out of control, and they start creating toxins. The polyps recoil. If temperatures drop, the corals can recover, but denuded ones remain vulnerable to disease. When heat stress continues, they starve to death.

Damaged or dying reefs have been found from Réunion, off the coast of Madagascar, to East Flores, Indonesia, and from Guam and Hawaii in the Pacific to the Florida Keys in the Atlantic.

The largest bleaching, at Australia's Great Barrier Reef, was confirmed last month. In a survey of 520 individual reefs that make up the Great Barrier Reef's northern section, scientists from Australia's National Coral Bleaching Task Force found only four with no signs of bleaching. Some 620 miles of reef, much of it previously in pristine condition, had suffered significant bleaching.

In follow-up surveys, scientists diving on the reef said half the coral they had seen had died. Terry Hughes, the director of the Center of Excellence for Coral Reef Studies at James Cook University in Queensland, who took part in the survey, warned that even more would succumb if the water did not cool soon.

"There is a good chance a large portion of the damaged coral will die," he added.

Scientists say the global bleaching is the result of an unusual confluence of events, each of which raised water temperatures already elevated by climate change.

> *"A lot of bleaching happened due to climate change, before the El Niño had even kicked in."* — **C. Mark Eakin, Coordinator, Coral Reef Watch**

In the North Atlantic, a strong high-pressure cell blocked the normal southward flow of polar air in 2013, kicking off the first of three warmer-than-normal winters in a row as far south as the Caribbean.

A large underwater heat wave formed in the northeastern Pacific in early 2014, and has since stretched into a wide band along the west coast of North America, from Baja California to the Bering Sea. Nicknamed the Blob, it is up to four degrees Fahrenheit warmer than surrounding waters, and has been blamed for a host of odd phenomena, including the beaching of hungry sea lions in California and the sighting of tropical skipjack tuna off Alaska.

Then came 2015, with the most powerful El Niño climate cycle in a century. It blasted heat across the tropical and southern Pacific, bleaching reefs from Kiritimati to Indonesia, and across the Indian Ocean to Réunion and Tanzania on Africa's east coast.

"We are currently experiencing the longest global coral bleaching event ever observed," said C. Mark Eakin, the Coral Reef Watch coordinator at the National Oceanic and Atmospheric Administration in Maryland. "We are going to lose a lot of the world's reefs during this event."

Reefs that take centuries to form can be destroyed in weeks. Individual corals may survive a bleaching, but repeated bleachings can kill them.

Lurid reports of damaged reefs started coming in from worried scientists in the summer of 2014.

Lyza Johnston, a marine biologist in the Northern Mariana Islands, dived to the reefs off Maug, a group of small islands: "In every direction, nearly all of the corals were bright white."

Misaki Takabayashi, a marine scientist at the University of Hawaii at Hilo, surfed the waves above the blue rice coral there: "I could see what looked like bleached white ghosts popping up off the ocean floor at me."

Cory Walter, a senior biologist at the Mote Marine Laboratory in Florida, peered down from a boat over Wonderland Reef off the Lower Florida Keys: "It almost looks like it snowed on the reef."

Predicting the duration of the bleaching or forecasting the next one is difficult. The Blob has cooled somewhat, and El Niño, while weakening, is expected to stretch into 2017.

Dr. Eakin, the coral-reef specialist at the National Oceanic and Atmospheric Administration, said he expected the bleaching to continue for nine more months. Scientists will not be able to measure the full extent of the damage until it is over.

What is clear is that these events are happening with increasing frequency — and ferocity. The previous bleachings, in 2010 and 1998, do not appear to have been as

(Continued on page 24)

Photo by Adrienne M. S. Correa

(Continued from page 22)

extensive or prolonged as the current one.

The 1998 bleaching, which Dr. Eakin said had been set off by a fierce El Niño, killed around 16 percent of the world's coral. By 2010, oceans had warmed enough that it took only a moderate El Niño to start another round.

Then in 2013, Dr. Eakin said, "a lot of bleaching happened due to climate change, before the El Niño had even kicked in."

Reefs that were bleached in 2014, like those in the Florida Keys and the Caribbean, had no time to regenerate before suffering further thermal stress from El Niño last year, leaving the coral vulnerable to disease and death.

The reefs in the Florida Keys "are about to go into a third year straight of bleaching, something that has never happened before," said Meaghan Johnson, a marine scientist at the Nature Conservancy. "We are worried about disease and mortality rates."

Ove Hoegh-Guldberg, the director of Australia's Global Change Institute, noted that 2015 was the hottest year ever recorded, both on land and in the oceans — breaking a record set just the year before.

"Rising temperatures due to climate change have pushed corals beyond their tolerance levels," he said, adding that back-to-back bleaching can be particularly deadly to the corals.

El Niño warms the equatorial waters around Kiritimati Island more than anywhere else in the world, making it a likely harbinger for the health of reefs worldwide. That is why Dr. Cobb, the Georgia Tech scientist who made the recent dive, has been making the trek at least once a year for the past 18 to the tiny atoll, part of the Line Islands archipelago.

Though the atoll sits just north of the Equator, trade winds suck water up from the depths of the ocean, usually keeping the water temperature surrounding the reefs a healthy, nearly constant 78 degrees.

But in 2015, the expected upwelling of deep, cold water did not happen, Dr. Cobb said, speaking by satellite phone after her dive. So water in the atoll was 10 degrees warmer than normal, and never cooled enough to allow coral to recover.

"The worst has happened," she said. "This shows how climate change and temperature stresses are affecting these reefs over the long haul. This reef may not ever be the same." ¶

Heron Island reef flat (Great Barrier Reef) in March 2011. (Photos for this article and also our back cover were taken by Adrienne M.S. Correa.)

There is a prevalent misunderstanding or misconception on the part of many non-Natives that only by administering "Western justice" can there be justice, and this perspective is ultimately harmful to the pursuit of alternative dispute resolution strategies at the village level.

This Luxury Cruise Ship Will Soon Sail Through The Arctic

Here's what that means for Alaska.

***Alaska Dispatch News*, 13 June 2016, by Annie Zak**—This summer, an extravagant cruise ship voyage will make history, and it's starting in Alaska.

A luxury vessel, the $350 million *Crystal Serenity* can carry up to 1,070 passengers and 655 crew members, and measures 820 feet long. On board, you'll find a casino, a library, penthouses and shops with name brands like Gucci, Armani and Dior, among other countless amenities.

(Courtesy Crystal Cruises)

The Crystal Serenity is planning a 32-day voyage through the Northwest Passage this summer.

On Aug. 16, the ship, full of creature comforts, will set out to travel through one of the world's harshest sea routes — the icy and isolated waters of the Northwest Passage through the Arctic Ocean. It will wind through narrow waters in far northern Canada as it sails for the first time from Seward to New York City — a 32-day voyage geared toward affluent world travelers.

All you need is about $22,000 to be a passenger. That's on the cheaper end of the scale — it's as much as $120,095 for the fanciest penthouse (but not to worry: even the lower-level penthouses come with personal butlers). Even if you can afford the trip, too bad — the cruise has been booked since shortly after tickets went on sale in 2014.

Such a voyage comes with specific challenges should something go wrong. Alaska is bracing for how it might handle the worst-case scenarios that might be unique to the unprecedented journey, which California-based Crystal Cruises says is the largest cruise ship ever to take this route.

Some communities in Alaska have been getting ready.

In Nome, Mayor Richard Beneville said the town has been planning for months to prepare itself for the largest infusion of tourists it has ever seen at once from a cruise.

"Without a doubt, Crystal Cruises' *Serenity* is the largest one and is kind of a game changer," Beneville said. "It's indicating what's going to be the future of transportation through the Bering Strait because of climate change."

Beneville said that Nome is working closely with the Coast Guard to prepare for what to do in the case of an emergency with massive ships like the *Crystal Serenity*. But an upcoming training exercise there won't happen until the day after the ship departs from Nome in August, which may seem counterintuitive.

"What they're really concerned about is those areas north of Nome," Beneville said

Derek Martin, the city manager in Kotzebue, told Alaska Dispatch News last year that an emergency response to accommodate 1,700 people would "create a bit of chaos" in the town of about 3,200. The ship won't be stopping there, or in Barrow, but those areas would be affected if passengers had to unexpectedly disembark and head to the nearest community.

The Coast Guard, over the past few years, has carried out rescue operation exercises and workshops or developed emergency plans for cities like Kotzebue, Nome, Barrow and others, for what to do in the face of things like a man-made incident or natural disaster. This preparation is part of what's called Operation Arctic Shield, the Coast Guard's seasonal deployment to the Arctic.

Coast Guard Lt. Cmdr. Jason Boyle said that while the agency doesn't do any rescue drills just for one specific company or industry, the Coast Guard has used the *Crystal Serenity* as the basis for some rescue operation exercises.

"What we would do from an agency perspective, how you would evacuate people if there was an accident on a ship if it was somewhere in the Arctic," he said. "We've walked through with the communities about what the challenges are if you were to have a number of people show up in your community, where do you shelter the people? How do you deal with medical injuries?"

As sea ice in the region continues to recede, more Coast Guard attention and resources will probably go to such exercises, said Cmdr. Mark Wilcox, Arctic operational coordinator for the agency.

Logistics and communication are the biggest hurdles when it comes to being prepared for the worst on routes like the one the *Crystal Serenity* will take, Wilcox said.

"Adapting to these constraints is the biggest challenge," he said. "Communication is difficult in the Arctic; it's more remote, the weather conditions are more extreme."

Passengers on board the *Crystal Serenity* need to be prepared, too. They are required to get $50,000 in emergency evacuation insurance to cruise through the Northwest Passage. The ship will also be traveling with its own escort vessel, the RRS Ernest Shackleton, which has ice-breaking capabilities. That vessel will be complete with helicopters on board for safety purposes, and will join the cruise ship at the Canadian community of Uluhaktok.

Crystal Cruises isn't the only company navigating the Northwest Passage. German company Hapag-Lloyd Cruises also has a Northwest Passage cruise that will depart in August and traverse Arctic waters around Canada and Greenland. Cargo ships have also made this voyage. Still, the *Crystal Serenity* appears poised to be the largest cruise ship to ever travel the route.

The company is wasting no time planning for next year — it has already announced another Northwest Passage voyage for summer 2017, and tickets are on sale.

Lower levels of sea ice in the Arctic have opened this route up to vessels. Last month brought another record low for Arctic sea ice, according to the National Snow and Ice Data Center.

As far as environmental concerns for traveling through such a sensitive area, Crystal Cruises spokesman Paul Garcia said that both the cruise ship and the icebreaker will travel using low-sulfur fuels. He also said the company will discharge gray and black water — that's wastewater from things like showers, washing machines and toilets — no less than 12 nautical miles from shore.

As for planning for the worst, Nome Mayor Beneville proceeds with caution.

"No one is expecting anything to happen," he said, "but that's what they said about the Titanic, too. We have learned over the years to try to be prudent." ¶

The Danger of a Runaway Antarctica

***The New York Times* Editorial Board, 31 March 2016**—Here are some disturbing things we have learned since December, when the nations of the world reached a landmark agreement in Paris to lower greenhouse gas emissions.

In January, scientists reported that 2015 was by far the hottest year on record, and another record could be set this year.

In February, a Princeton-based research organization said the tidal flooding that has already made life miserable for people in coastal cities like Miami and Charleston is getting steadily worse.

In mid-March, a group of experts, including James Hansen, the retired scientist who first brought the perils of climate change to Congress's attention in 1988, warned that shifts in climate could be sudden and abrupt, giving humanity little time to prepare for flooding, severe droughts and other upheavals.

In January, scientists reported that 2015 was by far the hottest year on record, and another record could be set this year.

Now comes another scary prediction: If carbon dioxide emissions from fossil fuels continue unabated, the vast West Antarctic ice sheet could begin to disintegrate, causing the sea to rise by five to six feet by the end of the century, destroying coastal cities and low-lying island nations and creating environmental devastation within the lifetimes of children born today.

The startling new finding was published Wednesday in the journal Nature by two experts in ice-sheet behavior: Robert DeConto of the University of Massachusetts, Amherst, and David Pollard of Pennsylvania State University. It paints a grimmer picture than the one presented only three years ago by a United Nations panel that forecast a maximum sea level rise of three feet by 2100. But that projection assumed only a minimal contribution from the massive ice sheets of Greenland and Antarctica. And things could get worse in the centuries to come — the melting from Antarctica alone, not counting other factors like thermal expansion, could cause the seas to rise by nearly 50 feet by 2500, drowning many cities.

But the report also contains what passes for good news nowadays: The collapse of Antarctica is not inevitable, it says, and could be prevented with an aggressive global effort to keep greenhouse gases at or below the levels called for in Paris, where leaders embraced a goal of holding warming "well below" an increase of two degrees Celsius compared with preindustrial levels.

But the pledges made by individual countries will not come close to meeting those targets, which means a great deal more work lies ahead for all nations — particularly big emitters like China, the European Union and the United States — to avoid trigger points at which the big ice sheets will begin to melt.

It also means that the United States must continue to exercise leadership, which has suddenly been cast into doubt by the presidential campaign and the Supreme Court. President Obama has done his part, moving aggressively to increase automobile efficiency, develop cleaner sources of energy and impose strict new limits on greenhouse gases from coal-fired power plants. The power plant rule in particular was crucial to securing agreements from other big coal users like China and India, and was important to the success of the Paris conference. But in February, the Supreme Court voted 5 to 4 to block that rule, pending a decision on its merits in a lower court.

In the meantime, Republican congressional leaders like Mitch McConnell of Kentucky, the Senate majority leader, have been doing their best to make sure that King Coal reigns forever. Though the Democratic candidates take global warming seriously, the two leading Republican candidates, Donald Trump and Ted Cruz, who don't have a rudimentary grasp of the subject, are not only criticizing Mr. Obama's initiatives but also questioning or denying the science of climate change. ¶

Nunavik Resident Demands Action From Leaders on Suicide Crisis

"Wake up, Inuit: it's time to make changes"

Nunatsiaq News—I am totally frustrated, because there have been two suicides last week in my hometown of Salluit.

The leaders at the Makivik's annual general meeting held last March in Kuujjuaraapik were all worked up talking about suicides.

One leader was even so glad that he had gone through difficult times — a lot of good that did to help anyone.

Wake up, Inuit: it's time to make changes; all the social workers are not going to solve our social problems. It is Inuit leading Inuit who will save lives because they know and value life.

Leaders of Nunavik: Please stop standing by while living is made harder, and learn to forgive one another, because this is really an obstacle to networking (helping each other, like our forefathers did). ¶

The Native mortality rate is more than three times the national average, and a significant percentage of Natives' deaths is alcohol-related.

Both the Native infant mortality rate and Fetal Alcohol Syndrome rate are more than twice the national average.

The birth rate among Alaska Native teens aged 15-19 was two-and-one-half times higher than their counterparts nationwide in 1988.

EDITOR'S NOTE: "Late-Breaking News"

Ottawa Announces Money for Indigenous Mental Health, Suicide Prevention

Funding targeted at indigenous communities, including Nunavut

***Nunatsiaq News,* 14 June 2016**—— The federal government announced money June 13 that is aimed at beefing up mental health supports in a number of Indigenous communities across the country, including in Nunavut.

Prime Minister Justin Trudeau announced $69 million to provide more resources to communities in Ontario, Manitoba and Nunavut to help them better cope with mental health needs and suicide crises.

"I have spent much of the last few months meeting with and listening to members of Indigenous communities, and the loss of life to suicide and the feelings of despair being felt in their communities – especially by their youth – is tragic and completely unacceptable," Trudeau said in a June 13 release.

"We all need to work together to find effective, sustainable and culturally appropriate services and programs that address the very real challenges being confronted by these communities."

Health Canada has yet to confirm what is specifically destined for Nunavut, but the $69 million will, in part, fund four crisis teams for communities identified as having the greatest need.

The money will also increase mental wellness teams from 11 to 43 in those affected communities, the release said.

The aid is targeted at communities that are located in rural, remote and isolated areas – essentially all of Nunavut – that are facing mental health and suicide crises.

The funding, which will be distributed over the next three years, also aims to help communities develop a more culturally-appropriate response to those crises, the prime minister's office said.

A one-year short-term suicide prevention plan announced by Nunavut organizations this past spring calls for a mobile trauma response team providing counselling and healing in Inuit languages across Nunavut, along with the creation of a seven new family resource workers.

The June 13 announcement includes "close collaborations with Inuit partners" to develop a community-led suicide prevention approach, the release said, but offers few other details.

"I am thankful for the government's funtding for immediate and targeted wellness support in Indigenous communities," said Nunavut Premier Peter Taptuna in a June 13 tweet.

"The Government of Nunavut and our partners are committed, as always, to working together to end the suicide crisis in Nunavut."

None of the new funding appears to be targeted at Nunavik, which has seen a higher than usual number of suicides and suicide attempts so far in 2016. ¶

Boaty McBoatface Given Real Name

But Will Still Forever Be Known as Boaty McBoatface

***gCaptain,* 6 May 2016, LONDON (Reuters)**—A new 200 million pound ($290 million) polar research ship is to be named after veteran BBC naturalist David Attenborough but the government promised on Friday that "Boaty McBoatface," the name which topped a public poll, would not be ignored.

The naming of the Royal Research Ship (RRS) attracted huge interest after the Natural Environment Research Council encouraged Britons to come up with suggestions, leading to a stream of light-hearted ideas such as RRS Usain Boat, RRS I Like Big Boats&I Cannot Lie and RRS Watch Out For The Iceberg.

Backed by a social media campaign, Boaty McBoatface easily topped an online poll with more than 124,000 votes although even the instigator of the Boaty name later apologised for his suggestion.

However, the government decided that the state-of-the-art ship which is due to set sail in 2019 would be named after Sir David Attenborough, 89, famed for his BBC TV natural history programmes which span six decades and whose name had attracted 11,000 votes.

But the ship's remotely operated undersea vehicle, which will collect samples from the deep waters of the Arctic and Antarctic, will be called Boaty McBoatface.

"The ship has captured the imaginations of millions, which is why we're ensuring that the Boaty name lives on through the sub-sea vehicle that will support the research crew, and the polar science education programme that will bring their work to life," said Science Minister Jo Johnson.

Attenborough, who will celebrate his 90th birthday on Sunday, said he was honoured.

"I … hope that everyone who suggested a name will feel just as inspired to follow the ship's progress as it explores our polar regions," he said. ¶ ***(Reporting by Michael Holden; editing by Stephen Addison)***

News From the Polar Archives

by Laura J. Kissel, Polar Curator
Byrd Polar and Climate Research Center Archival Program The Ohio State University

Readers of *The Polar Times* may be surprised to learn about the wide variety of materials that the Polar Archives has received over the last couple of years.

In 2014, we received a total of 8 new accessions:

- An image of Admiral Byrd's grandmother
- Philip M. Smith Papers (finding aid online) (6 c.f.)
- A publication called, "Highlights of the Byrd Antarctic Expedition"
- Edgar F. Cox Papers – Cox was the herdsman on Byrd's Second Expedition to Antarctica (4.5 c.f.)
- A publication called, "The Winter Night Trip to Advance Base, Byrd Antarctic Expedition II, 1933-1935"
- A collection of 5 Byrd Expedition postal covers (envelopes) (philately)
- A major addition of 20 c.f. of Wilkins collection materials. After weeding and sorting, this came down to about 11 c.f. of additional materials. Processed and added to the Wilkins collection finding aid online.

In 2015 we received a total of 9 new accessions:

- Katharine Byrd Breyer v. Richard Byrd III Lawsuit Papers – 5.75 c.f.
- Henry Brecher Papers (addition) – slides and prints documenting Brecher's fieldwork in Antarctica, Greenland, Canada, Peru, China and Tanzania.
- Polar philately – Byrd expedition items, including envelopes and stamps
- Francis Dana Coman Collection – consisting of 2 compasses and Coman Croix de Guerre Medal
- More Polar Philately – Pitcairn Island Commemorative stamp set commemorating Byrd's visit to Pitcairn Island in December 1939
- Two letters from Walter Giles, a marine corps pilot with the US Antarctic Services Expedition (1939-1941), to his sister Ruth Giles, dated 1939 and 1940, from Antarctica. Of note, the Pitcairn Island cover, cancelled at Pitcairn Island 14 December 1939.
- Fur lined leather hat and snow goggles with hinged eye covers
- Ashley C. Snow Publications, artifacts and correspondence: A Voyage Towards the South Pole and Round the World. 2 volume set, by James Cook, 1777; Sailing Directions for Antarctica: 1943, 2 copies; radiograms; correspondence; Polar Times, 1 pair leather mittens, 1 pair wool mittens, 1 pair green wool gloves (liners).
- From Leverett Byrd: 6 U-matic 3/4" tapes and 32 vhs tapes, covering a variety of polar topics, including vhs versions of Byrd films, as well as polar related television programs and an oral history interview.

In 2016, so far – we have received:

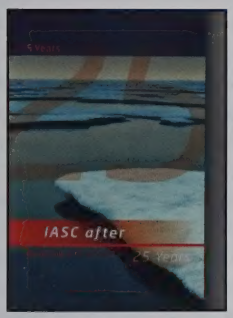
- A singular image of Wilkins
- A photograph of an enormous dog (from the Endurance expedition)
- An envelope from the Arctic Submarine Nautilus
- An addition to the Bentley Papers – 7.5 c.f. – documenting the Ice drilling program.
- Yet more philately – BAE II commemorative postal covers
- South Pole Traverse Project Records from David Bresnehan, an administrator with NSF
- Slides of Mendenhall Glacier and Mt. Rainier taken in 1962
- A scrapbook documenting the expeditions of Admiral Byrd – with a handmade wooden cover with a wood-burned image of Byrd's radio towers!

You may wonder how to find out what materials are held by the Polar Archives here at OSU. We have a listing of all of our collections on our website, and many have online finding aids. However, it has always been a challenge to let people know about the smaller, more random items that we have. We are currently transitioning to a new acquisitions system that will allow us to do just that! We will soon be adding this information to our website. Stay tuned! For more information, visit us at: Go.osu.edu/polararchives. Questions? Contact Laura Kissel, the Polar Curator at kissel.4@osu.edu. ¶

Seavey Wins 'Iditarod' Four Times in Five Years

Twenty-nine-year-old Dallas Seavey won his third straight Iditarod Trail Sled Dog Race, taking his fourth overall title in the last five years. He set a record eight days,11 hours, 20 minutes, and 16 seconds to travel nearly 1,000 miles across Alaska. ¶

Book Reviews



IASC After 25 Years

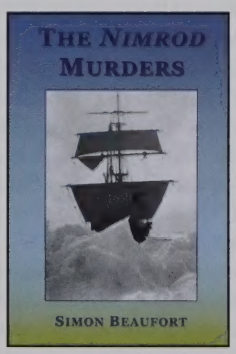
by Odd Rogne and others, *eds.*
IASC, Potsdam, Germany, 2015, 127 pp.
ISBN: 978-3-9813637-7-7

Reviewed by John Splettstoesser

The International Arctic Research Committee (IASC) has published a review of its history for a period of 25 years by printing some 30 chapters in five major sections by individuals involved in IASC, some of them for its entire history. The five sections include "Development of IASC," "IASC Initiatives," "Contributions of Former IASC Presidents," "Cooperation With Other Organizations," and "The IASC Secretariat." The six appendices include a "List and Addresses of IASC's National Adhering Bodies," "IASC Council List," "IASC Projects (25), Networks (9), and Action Groups (4)," and "Scope of the Action Groups (5)." Contributing authors number 22, Reviewers of the content number 16, and the editorial team included Odd Rogne, Volker Rachold, Louwrens Hacquebord, and Robert Corell. The Preface by Susan Barr, IASC President in 2014, describes its initiation in how it grew from an outgrowth of lessons learned from Polar Years and also from SCAR as "a model for the idea of a nongovernmental scientific body in the Arctic that could help to promote and facilitate cooperation and coordination within the various disciplines over the entire circum-Arctic."

IASC now consists of representatives of 22 member countries and the membership continues to grow. IASC got off to a good start when the President of the United States appointed James H. Zumberge as its first Chairman. At the time, Zumberge was President of the University of Southern California, and also President of SCAR. A copy on p. 11 of a letter dated 30 May 1986 from Zumberge to Odd Rodne, Director of the Norsk Polarinstitutt, set the stage for IASC's start by inviting key individuals from countries active in Arctic research to discuss existing mechanisms for international cooperation in Arctic research. The meeting was held in conjunction with a meeting of SCAR-19 in San Diego in June 1986, and thus began the initiative that carried forward for the next 25 years. It was apparent that some non-Arctic countries would also become part of the Committee because they had active programs in the Arctic that produced valuable information that would benefit other countries. Some subjects of study and research have no geographic boundaries in this regard, for example, climate change, an issue of global importance. It also became apparent early in the organization that IASC included and actively recruited young scientists to participate in its activities, as they took the burden of reporting and adding new ideas, whereas older scientists served as councilors or mentors. This practice was further developed during IPY by initiating the Association of Polar Early Career Scientists (APECS), an excellent way to prepare future IASC leaders (p. 93-95, and 108).

The book includes summaries of numerous meetings and working groups and their results, along with color photographs of IASC officers and others. Supporting documents (p. 127) are available at the website http://iasc25.iasc.info/ (IASC Handbook; Selected Historical Documents; Council Reports; IASC Reviews; Brochure; and Interviews — an approximately 20-minute film). The 25-year history of IASC plus the 50-year history of SCAR as a pair provide excellent coverage of international collaboration for the benefit of science. (See a review of the SCAR history in *The Polar Times*, July 2013, p. 34.) ¶

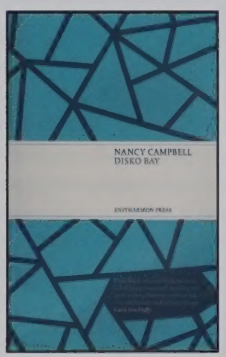


The Nimrod Murders

by Simon Beaufort
Erskine Press. 376 pages
ISBN: 978 1 85297 112 0
HB £16.95, Soft £9.95

Reviewed by Charles Lagerbom

In early summer 1907 during the final frantic weeks before Ernest Shackleton and crew set sail on his *Nimrod* Expedition for the frozen Antarctic, the assistant biologist has turned up dead. To complicate matters, the man has been murdered with a letter opener to the throat, his body found among gear ready to be stowed aboard *Nimrod* at London's East India docks, and there appear to be plenty of possible suspects from the crew, scientists, dockworkers and others. This is the setting for the excellent crime fiction novel entitled *The NIMROD Murders*. The author, Simon Beaufort, is a pseudonym for two people at one time associated with the Scott Polar Research Institute. One is an historian and the other a successful crime writer. They have teamed together to produce a great murder mystery, one in which young Raymond Priestly takes on the role as assistant detective to help solve the grisly deed and prevent scandal from enveloping the expedition. The captain, crew and scientists all come under scrutiny as Shackleton tries to find the culprit amidst the chaos and excitement of departing for the Antarctic. Beaufort does a great job setting the scene and time of Edwardian London and leads the reader on a crackling good read, one which keeps young Priestly and the reader grasping for leads until the final pages. Published by Erskine Press, the book is available through them at www.erskine-press.com



Disko Bay

by Nancy Campbell
London, Enitharmon Press
2015, 64 pages, Paperback,
£9.99 ($14.65), ISBN 978-1-910392-18-8

Reviewed by John Splettstoesser

The place, Disko Bay, is on the western coast of Greenland and has a long history of settlements with hunters, whalers, missionaries, scientists, and shamans. This book of 60-some pages of poems includes examples of the lives and cultures of these people of the Arctic, with subjects relating to the harsh conditions of survival under which they live; their hunting; the ice; their settlements; the transition from early forms of living, from traditional ways of subsistence to the tensions of modern life.

A second section of poems is based on Ruin Island, north of Disko Bay, but the subjects are about the same. The legendary leader Qujaavaassuk, quoted in some of the poems — such as "The Day the Tides Froze" and "In Danger of Snow Blindness" — give the reader some idea of the living conditions for Arctic cultures in the last several centuries. Some poems are offered in both English and their equivalent

in the Greenlandic language; others are presented in English only. The heading page for Ruin Island has a prophetic verse that probably reflects the commonality of many poems and their subject, namely, "Our tales are narratives of human experience, and therefore they do not always tell of beautiful things." (Osarqaq)

Two poems in the "Disko Bay" section of the book (pp 9-32) include words that describe female genital content in relation to tales of a female shaman. "Song of a Wicked Woman Whose Knowledge Knew No Limit" is one of them, describing one way to kill your enemy.

Poems in the "Ruin Island" section (pp 35-46) have different ways of expressing similar subjects as those for Disko Bay, perhaps illustrating a matter of contrasts in tribal settlements.

A final section on Jutland, the portion of mainland Europe that includes continental Denmark and a border with Germany (pp 49-62) includes poems and essays that differ from Greenland lore and are included as they relate to the disappearance of Arctic ice.

The author has worked as a writer in residence at a number of ecological and research institutions, from the world's most northerly museum on the island of Upernavik, Greenland, to the University of Oxford. This book will appeal mainly to anyone with an interest in Greenlandic cultures and tales of myth and human survival in conditions that have not changed much for centuries, commonly related to hunting and food availability, and to those verses that relate to what we today refer to as "climate change" and "disappearing sea ice." ¶

OBITUARIES

John Spletstoesser

John Splettstoesser of Waconia, Minnesota passed away Monday, January 25, 2016, at his home. John was 82.

A memorial service was held February 5 at the Waconia Moravian Church with a gathering of family and friends.

Many will remember John from his days at Ohio State University (OSU). John was assistant director of the Byrd Polar & Climate Research Center (then known as the Institute of Polar Studies) from July 1967 through May 1974. He left OSU to become co-director of the Ross Ice Shelf Project (RISP) Office at the University of Nebraska–Lincoln.

John, a geologist, worked mainly in Antarctica and received two polar medals for his work there. In recognition of his work, two places bear his name. The first is Splettstoesser Glacier (79°12'S; 84°09'W) which is a 35-mile-long glacier flowing ENE through the Heritage Range to the South of Founders Peaks and Anderson Massif. It was named after John for his participation in the 1961-62 Ellsworth Mountain Part. Twenty years later, Splettstoesser Pass (71°39'S; 167°15'F) was named for John to acknowledge his role as the U.S. Antarctic Research Program (USARP) field coordinator during the Northern International Victoria Project in 1981-82.

John had a long work career as a geologist and was a committed polar scientist. Most recently he served as a lecturer/naturalist on more than 100 cruises to Antarctica.

John was a member of the International Association of Antarctica Tour Operators (IAATO); the author of approximately 175 publications; past-president of the Antarctican Society; past-president of the American Polar Society (APS); and was still active in APS as the chair of the Board of Governors.

He was a friend to all, a wealth of knowledge, and always added a positive note to the conversation. It has been said that he was the kind of man we all strive to be. ¶

Donald Richard Walk

Born May 5, 1933, Reedsville, PA, son of George Donald and Edna Morgan Walk of Reedsville, died May 3, 2016, Fair Oaks, CA. Don, also known as "Dick" graduated from Armaugh-Brown High School in 1951, attended Susquehanna University and Hahnemann Medical College in Philadelphia. He joined the United States Navy and served as a Medical Officer for about ten years. A highlight of his Navy service was an assignment as Officer-In-Charge of the Admiral Byrd Station in the Deepfreeze Program (1960-61), in Antarctica for 13 months. Subsequently, the U.S. Board on Geographic Names named an Antarctica Glacier after him. Dick then went to the Oakland Naval Hospital to study becoming a psychiatrist. Upon his Navy retirement, he practiced medicine and psychiatry in California; working in mental health clinics, hospitals, prisons, private practice, and for the government. He settled in Carmichael, where his mother Edna resided with him for many years. Dick was known to travel extensively; he visited over 60 countries, and he loved all types of music, particularly classical music. Dick played the piano and organ, enjoyed Music Circus and Mondavi Performances, and was known for many fun parties he held at his home, and for his great sense of humor. From his travels he developed a family of friends. Don will be remembered and missed dearly by his cousin Tom and by all who knew and loved him. Donations can be made to the American Theatre Organ Society (ATOS), 7800 Laguna Vega Drive, Elk Grove, CA 95758. ¶

Nicholas Clinch

By Bruce Weber, 22 June 2016—Nicholas Clinch, an audacious and intrepid mountaineer who led first-ascent expeditions of skyscraping peaks in the Himalayas and in Antarctica, died on June 15 in Palo Alto, Calif. He was 85.

The cause was cancer, a nephew, Richard Kylberg, said.

An unusual figure in the world of elite mountaineering, Mr. Clinch was a tall, somewhat gangly man whose slight build was not in the hardy athletic mold of a world-class climber. He was, in addition, asthmatic.

But he found his niche in the field by applying his intelligence, technical skill, practical knowledge and perseverance. In October 1955, Mr. Clinch, then in his mid-20s, was relaxing after a spaghetti dinner with some fellow climbers in a Northern California living room when he issued an almost casual challenge.

"Who wants to climb Hidden Peak in 1958?" he asked.

The reference was to the 11th-highest mountain on earth, located in the Karakoram range in northeast Pakistan. Known also as Gasherbrum I, at about 26,500 feet it is one of the 14 mountains higher than 8,000 meters and was, at the time, the second-highest unclimbed peak in the world. (Dhaulagiri, in Nepal, at nearly 26,800 feet, was not climbed until 1960.)

His companions laughed — justifiably, Mr. Clinch would later write — but he assembled a small team of climbers (including two men who were there for the first inquiry), secured permission for the trek from the Pakistani government, shipped 7,000 pounds of food and equipment halfway around the world, and met his original deadline.

In the spring of 1958, Mr. Clinch led a support army of more than 100 people from the town of Skardu to Hidden Peak, 150 miles away, and in early July two members of the climbing party, Pete Schoening and Andy Kauffman, achieved the summit. An assault on the peak from a final temporary camp by a second group of climbers, including Mr. Clinch, was canceled because of threatening weather.

That others got the glory for the first ascent was no bother to Mr. Clinch, a lawyer by profession who scaled mountains on several continents and was known among mountaineers as a consummate team player and a leader and organizer of infinite patience, diligence and humor.

"He would say to me, 'The mountains don't care who you are,' " Mr. Kylberg, his nephew, said, meaning that great athletes could founder in the wild at high altitudes as easily as anyone else. "He saw the mountains as a great human equalizer."

Mr. Clinch's physical achievements in enduring what he described, in The Saturday Evening Post in 1961, as "the special agonies of high-altitude climbing, when the combination of blazing sun and snow makes it feel as if your head were in an oven and your feet in a freezer while you carry heavy loads," were nonetheless impressive. In 1960, he had organized another first ascent in the Karakoram, leading a team of American and Pakistani mountaineers to the top of Masherbrum — sometimes known as Doomsday Mountain — at upward of 25,600 feet.

"Nick had the capacity to fantasize and to translate fantasy into reality," Tom Hornbein, who was part of the Masherbrum team, said in a telephone interview. Asked how a less than robust physical specimen could conquer such mammoth peaks, Mr. Hornbein (who in 1963, with another climber, forged a new route up Mount Everest) said that Mr. Clinch was a highly proficient climber technically, and that his ability to apply his climbing experience to the problems in front of him was peerless.

"Nick," he added, "was not lacking in drive."

Nicholas Bayard Clinch III was born in Evanston, Ill., on Nov. 9, 1930, and grew up in Dallas and in Roswell, N.M., where he attended the New Mexico Military Institute. His father was a military flyer who became a colonel in the Air Force.

Nicholas III graduated from Stanford and went on to earn a law degree there. Like his father, he served in the Air Force. In the 1970s, he was a lawyer for the Lincoln Savings and Loan Association, the financial institution in Irvine, Calif., that went bankrupt in 1989 during a scandal that sent Charles H. Keating Jr., the chief executive of its parent corporation, to prison for fraud.

Mr. Clinch was a longtime member of the American Alpine Club and its president from 1968 to 1970. He was the executive director of the Sierra Club Foundation from 1975 to 1981, and he worked as an environmental consultant for the Fluor Corporation, a Texas-based engineering and construction firm.

His attraction to the mountains began when he was a teenager. He spent summers at an adventure camp in Estes Park, Colo., and met many friends, including Mr. Hornbein, who would become climbing colleagues.

Mr. Clinch married Elizabeth Wallace Campbell, known as Betsy, in 1964. Together they wrote "Through a Land of Extremes: The Littledales of Central Asia" (2011), about the British explorers and adventurers St. George Littledale and his wife, Teresa. Mr. Clinch was also the author of "A Walk in the Sky" (1982), an account of the Hidden Peak expedition.

Mr. Clinch is survived by his wife; a sister, Lee Everding; and two daughters, Alison Clinch and Lee Bridges.

One more of Mr. Clinch's remarkable climbing ventures, perhaps the most remarkable: In December 1966, with the sponsorship of the American Alpine Club and the National Geographic Society, he led a team of American climbers in the first ascent of Mount Vinson, at just over 16,000 feet the highest peak in Antarctica. In temperatures well below zero (and in 24-hour sunlight), all 10 climbers in the group reached the summit. In 2006, according to the United States Geological Survey, a nearly 15,900-foot mountaintop, 1.4 miles southeast of Mount Vinson, was named in his honor: Clinch Peak. ¶

Thomas Norwood Taylor

Thomas Norwood Taylor, 78, beloved father, brother, friend and husband, died on Thursday, April 28 at home. He was born in Lakewood, OH and received his bachelor's degree at Miami University of Ohio, where he majored in botany (minor in geology) and played on the golf team. He received his Ph.D. in paleobotany from the University of Illinois (1964) and went to Yale on a National Science Foundation (NSF) postdoctoral fellowship. He served on the faculty at the University of Illinois, Chicago; Ohio University; and Ohio State University, where he was also chair of the Plant Biology Department. He came to KU in 1995 as a Distinguished Professor of Ecology & Evolutionary Biology and Curator of Paleobotany in the Biodiversity Institute. He was elected to the National Academy of Sciences in 1994 and was appointed by the President to the National Science Board (2006-2012). He received numerous awards in his profession for his research, leadership, and teaching; served on local, state, national and international committees; volunteered for numerous administrative tasks throughout his career; and specialized in helping young faculty get funding for their research. His research was supported by the NSF for more than 50 years. He published 14 books and edited volumes, including textbooks, and more than 450 journal articles and book chapters. He loved fieldwork and collected fossil plants on 6 continents, including Antarctica. Tom truly loved his chosen profession, paleobotany, and made friends all over the world who will greatly miss him and his support and friendship.

Tom was preceded in death by his parents, Velma and Allyne Taylor, and by his son, Timm. He is survived by Edie, his wife of 30 years and the love of his life, his six beautiful children: Tami (Donny) Simmons, Traci (William) Preble, Trisha (John) Besselman, Todd (Carrie) Taylor, Trevor Taylor, and Sarah Larkin, and by his 14 amazing grandchildren, sister Jackie (Richard) Taylor-Gergel, and brother Jerry. ¶

COMING SOON ... New Site

Our Web site (www.americanpolar.org) is currently undergoing a redesign, which may have some effect on how various aspects of the current site function. We ask your patience during this redesign period as we work toward a more robust site that will both fully benefit our current members and enlighten prospective members and visitors. We appreciate your understanding. ¶

Contents

APS President's Message 2
Membership Letter 2
Editor's Privilege: John Splettstoesser 3
Life as the Ninth Inning Nears 3
'Spletts Rocked!' 4
Memories of Father 6
Rising Concerns 8
Editor's Alert 8
What You Need to Know re Climate Change 8
Beaufort Sea Polar Bears Spending More Time Ashore 10
Asgard Range with Catspaw Glacier 11
Antarctic Mt Named for APS Member 11
More Assets for the Arctic 12
Centerfold: Panhelion 16
Juneau Man Captures Story of 'Storis' in Documentary 18
Alaska Faces Clear Budget Deficit Without Evident Solution 19
Russia Weighs Cuts to Icebreaker Funding 19
Oil Companies Abandoning Arctic as Temps Rise on Drilling Debate 20
Unmanned Drones Sail the Bering Sea 21
Climate-Related Death of Coral Around World Alarms Scientists 22
Luxury Cruise Ship Will Sail Arctic 25
The Danger of a Runaway Antarctic 26
Nunavik Resident Demands Action From Leaders on Suicide Crisis 26
Ottawa Announces Money for Indigenous Mental Health, Suicide Prevention 27
Boaty McBoatface Given Real Name 27
News From the Polar Archives 28
Seavey Wins 'Iditarod' Four Times in Five Years 28
Book Reviews 29
Obituaries 30